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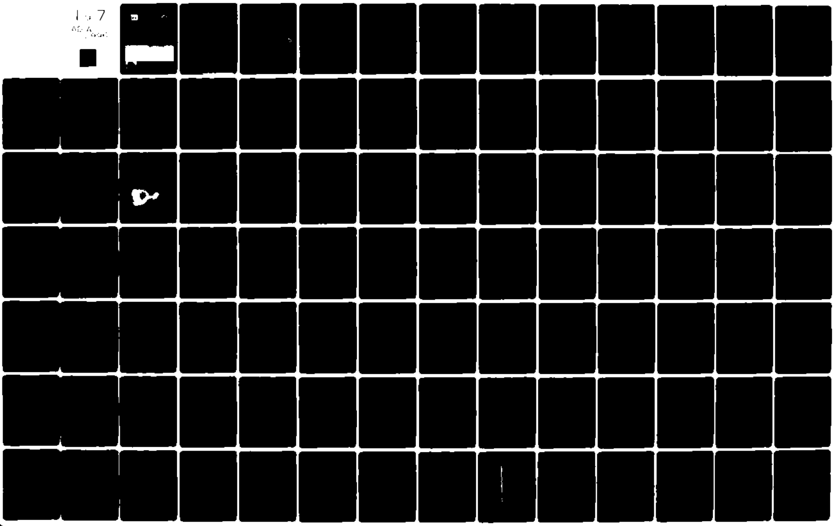

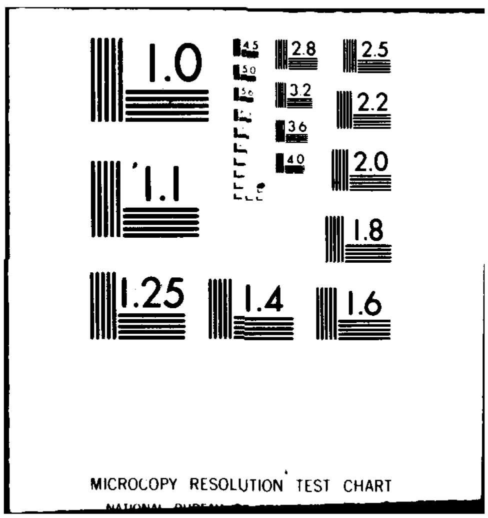
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LAKE PONTCHARTRAIN AND VICINITY HURRICANE PROTECTION PLAN

PROTOTYPE DATA ACQUISITION AND ANALYSIS

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Prototype tidal elevation, current, and wind data were acquired and analyzed as a part of a study to evaluate the effects of the Lake Pontchartrain and Vicinity Hurricane Protection Plan on (a) tidal prism and circulation in Lake Pontchartrain, (b) hurricane surge levels in Lake Pontchartrain and vicinity, and (c) water quality in Lake Pontchartrain. Results of the analysis of prototype tidal elevation and current data will be used during verification of a numerical tidal circulation model.

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20. ABSTRACT (Continued).

Data were included in the analysis from (a) an intensive tidal elevation and current data acquisition program for a duration of approximately 30 days; (b) a water quality program immediately following the intensive program, for monitoring tidal elevations, and, on a less extensive basis, currents, temperature, and conductivity in Lake Pontchartrain; and (c) a supplemental tidal elevation and current data acquisition program to provide additional data for numerical model verification. A water quality transect survey was conducted during both the intensive program and the supplemental survey for dissolved oxygen, pH, temperature, and conductivity. The intensive program also included a 25-hour current boat survey at six ranges in the tidal passes to Lake Pontchartrain and in the Inner Harbor Navigation Canal.

Tidal analysis results show that the diurnal O1 and K1 constituents have the largest amplitude in Lakes Pontchartrain and Borgne and indicate that the diurnal tides in Lake Pontchartrain are co-oscillating with little change in constituent amplitude over the lake. Data from the water quality program were limited due to generally low velocities in Lake Pontchartrain and low salinity levels during most of the observation period.

Surface elevation and currents during operation of the Bonnet Carre Floodway in the spring of 1979, Hurricane Bob, and Hurricane Frederic also are discussed.

PREFACE

The prototype data acquisition and analysis reported herein were conducted to provide data for calibration and verification of numerical models to be used for evaluating effects of the Lake Pontchartrain and Vicinity Hurricane Protection Plan on tidal conditions, hurricane surge levels, and water quality.

Project administration and funding were provided by the U. S. Army Engineer District, New Orleans (LMN), under the project management of Messrs. C. Soileau and J. Combe and the general direction of Mr. F. Chatry, Chief of the Engineering Division, and Messrs. P. Becnel and C. Soileau, Chiefs of the Hydraulic and Hydrologic Branch. General project administration for the Lower Mississippi Valley Division-Mississippi River Commission was provided by Mr. H. E. Walker.

Data acquisition and analysis were conducted by the U. S. Army Engineer Waterways Experiment Station (WES) in the Hydraulics Laboratory under the general supervision of Messrs. H. B. Simmons and F. A. Herrmann, Jr., Chief and Assistant Chief, respectively, of the Hydraulics Laboratory; Dr. R. W. Whalin, Chief of the Wave Dynamics Division, and Mr. C. E. Chatham, Chief of the Wave Processes Branch (WPB). This report was prepared by Mr. D. G. Outlaw, WPB. Prototype data acquisition was conducted by Mr. G. M. Fisackerly, Chief of the Harbor Entrance Branch, Estuaries Division. Data analysis was conducted by Mr. Outlaw with the assistance of Messrs. K. A. Turner and L. A. Barnes, and Ms. M. A. Hampton and J. Jones.

Study consultants were Dr. D. W. Pritchard, Professor R. O. Reid, Dr. B. LeMehaute, Dr. L. E. Cronin, Dr. S. L. Yu, and, initially, Dr. D. Ross.

Commanders and Directors of WES during data acquisition and analysis, and the preparation and publication of this report were COL John L. Cannon, CE, COL Nelson P. Conover, CE, and COL Tilford C. Creel, CE. Technical Director was Mr. F. R. Brown.

CONTENTS

CONVERSION FACTORS, U. S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U. S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	By	To Obtain
degrees (Fahrenheit)	5/9	Celsius degrees or Kelvins*
feet	0.3048	metres
feet per second	0.3048	metres per second
inches	25.4	millimetres
knots (international)	0.5144444	metres per second
miles (U. S. statute)	1.609344	kilometres

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use: $K = (5/9)(F - 32) + 273.15$.

LAKE PONTCHARTRAIN AND VICINITY HURRICANE PROTECTION PLAN

PROTOTYPE DATA ACQUISITION AND ANALYSIS

PART I: INTRODUCTION

Background

1. Lake Pontchartrain, Figure 1, is located north of and adjacent to the city of New Orleans, Louisiana. The two major natural outlets of the lake are The Rigolets, approximately 8.5 miles* long, and Chef Menteur Pass, approximately 6.5 miles long, near the east end of the lake. Lake Pontchartrain also is connected with the Gulf through the Inner Harbor Navigation Canal (IHNC), Intracoastal Waterway, and the Mississippi River-Gulf Outlet Channel (MR-GO). Lake Maurepas, west of Lake Pontchartrain and Lake Pontchartain are connected by Pass Manchac. Lake Pontchartrain is about 25 miles wide at its widest point and is about 40 miles long.

2. Tides are primarily diurnal in Lake Pontchartrain and the surrounding study area. Mean tide ranges (Tallant and Simmons 1963) are:

Location	Range, ft
Point Chicot, Chandeleur Sound	1.3
Long Point, Lake Borgne	1.0
Lake Pontchartrain	0.4
Pass Manchac and Lake Maurepas	0.3

Mean maximum current velocities in The Rigolets, Chef Menteur Pass, and Pass Manchac are approximately 1.9, 2.8, and 2.0 fps respectively. Observed current velocities in Lake Pontchartrain during a one-year period in 1958-59 were near 0.5 fps or less (U. S. Army Engineer District, New Orleans 1962).

* A table of factors for converting U. S. customary units of measurement to metric (SI) units is presented on page 4.

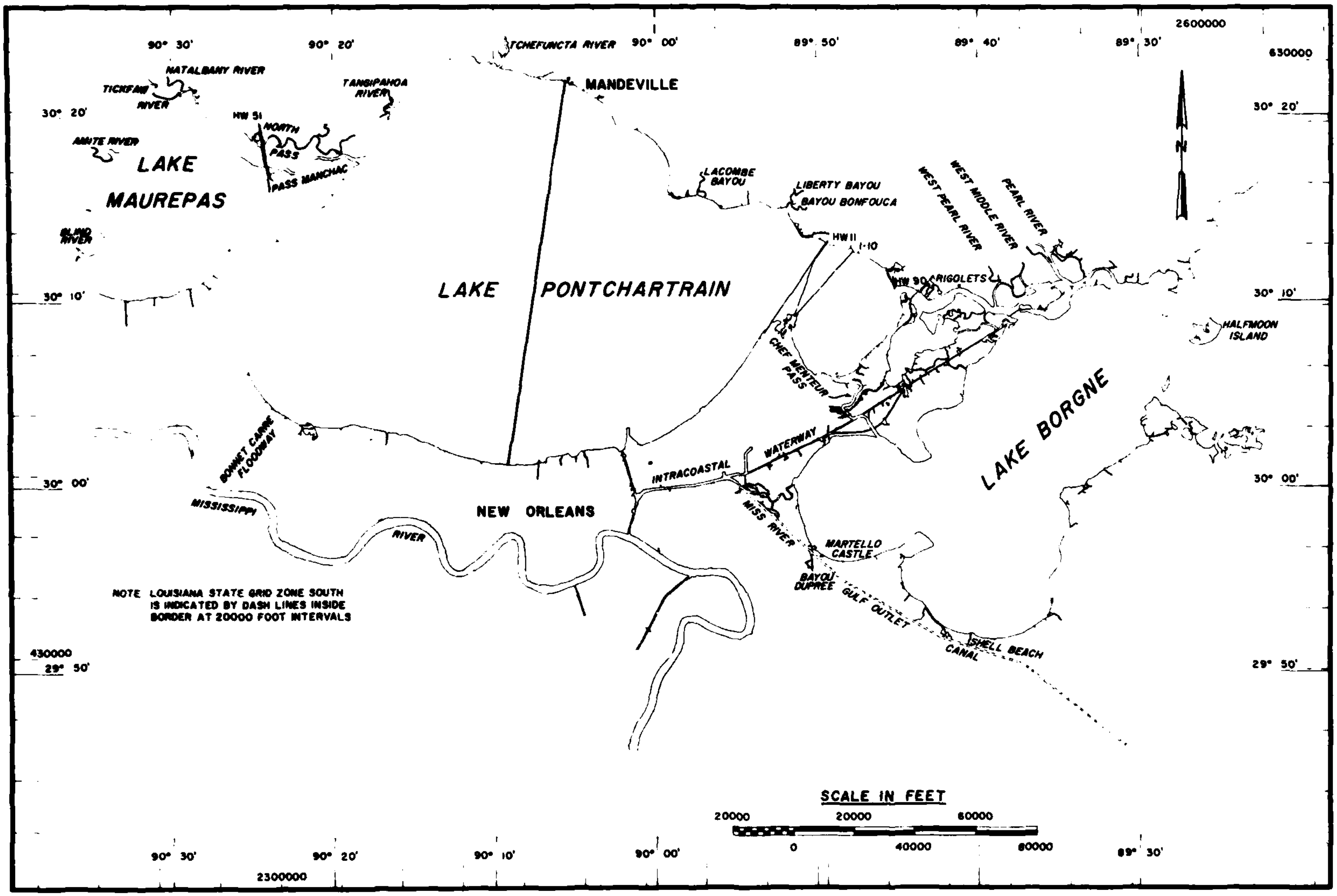

Figure 1. Vicinity map

3. Gated structures are proposed for The Rigolets and Chef Menteur Pass to protect areas near Lake Pontchartrain from possible flooding during hurricanes. A lock and a small gated structure at the north end of the IHNC will protect Lake Pontchartrain and vicinity from hurricane surges entering through the IHNC. During normal tidal conditions, the gated structures will remain open and allow ebb and flood flow to proceed in a normal fashion.

Purpose of Observations

4. Prototype data (tidal elevations, currents, wind speed and direction, temperature, conductivity, dissolved oxygen, and pH) in Lake Pontchartrain and the surrounding study area were collected and analyzed as a part of the study to evaluate effects of the Lake Pontchartrain and Vicinity Hurricane Protection Plan on:

a. Tidal prism and circulation in Lake Pontchartrain.

b. Hurricane surge levels in Lake Pontchartrain and vicinity.

c. Water quality in Lake Pontchartrain.

A numerical tidal circulation model (Butler 1978a, b, and c) developed at the U. S. Army Engineer Waterways Experiment Station (WES) is being modified and used to evaluate the effect of the barrier plan on the tidal prism, tidal circulation, and surge levels. Results from the tidal circulation study and water quality data obtained will be used in the evaluation of the effect of the plan on water quality.

5. Elements of the portion of the barrier plan study being performed by WES include:

a. Acquisition and analysis of prototype data on tidal elevations, currents, wind speed and direction, conductivity, temperature, dissolved oxygen, and pH.

b. Construction and testing of undistorted physical 1:100-scale models of Chef Menteur Pass and the IHNC to quantify flow conditions across the barriers and use of data from a previous undistorted physical 1:100-scale model of The Rigolets to quantify flow conditions across the barrier.

c. Analyses of tidal circulation with and without the proposed hurricane barrier plan.

d. Analyses of hurricane surges for various storm tracks using hurricanes of different intensities with and without the barriers in place.

e. Collection of a data base for verification of a numerical water quality model if required at a later date.

Prototype tidal elevation and current data and meteorological data are required for verification of the numerical tidal circulation model and for definition of boundary conditions for the numerical model. Some water quality parameters (conductivity, temperature, dissolved oxygen, and pH) also were measured in the study area and are described in Appendix A.

6. Prototype data acquisition and analysis presented in this report include data acquired primarily by WES during the study. An extensive data base is available for study of the lake from many other sources. These sources include data available from U. S. Army Engineer District, New Orleans (LMN) tide and salinity gage records, LMN periodic water quality sampling, Louisiana State University studies of the lake, National Oceanic and Atmospheric Administration climatological records, historical accounts of hurricane flooding, and other sources.

Prototype Data

7. Prototype data acquisition included an intensive tidal elevation and current data program for a duration of approximately 30 days and a long-term water quality program lasting for approximately one year immediately following the intensive current data program. Data stations for the intensive program included:

a. Tidal elevation measurements at 18 stations.

b. Tidal current measurements at 21 stations.

c. Conductivity and temperature measurements at 9 stations.

d. 25-hour current survey at 16 stations over 6 ranges.

e. Wind speed and direction measurements at 2 stations.

f. Conductivity, temperature, dissolved oxygen, and pH measurements at three depths (two depths at shallow locations) at periodic distances at stations along a set of predetermined transects in Lake Pontchartrain and Lake Borgne.

Water quality data stations included:

- a. tidal elevation measurements at 18 stations.
- b. Tidal current, temperature, and conductivity measurements at 14 stations.
- c. Wind speed and direction measurements at 2 stations.
- d. Salinity measurements at 20 stations.

LMN tide gage data from two stations near each end of The Rigolets, a station near the center of Chef Menteur, and a station near the south end of the Highway 11 Bridge at Irish Bayou also are being used for numerical model verification.

Measurement Locations

8. WES tide gage locations designated by prefixes B, M, P, and R for Lake Borgne, Lake Maurepas, Lake Pontchartrain, and The Rigolets, are shown in Figure 2 and were identical for both the intensive program and the water quality program. Gage mount description at each location is given in Table 1. Tide gage data were referred to an undistorted plane datum known as the Simmesport Free Adjustment. Sta B-1 and B-3 were omitted from the survey due to their remote location. In 1976-77, the National Geodetic Survey (NGS) ran about 1000 miles of First Order Class I levels at the request of LMN. A portion of these levels consisted of closed loops to N-250 at Simmesport, Louisiana, and have subsequently come to be called "Simmesport Free Adjustment." The term "free adjustment" means that the levels were not constrained by the previously published NGVD elevations at benchmarks on the individual level lines, but are allowed to set new elevations at each benchmark. The levels were corrected for curvature, refraction, rod calibrations, C-factor, orthometric corrections, etc. This free adjustment has the advantage of providing undistorted differential elevations between benchmarks and is thus suitable for scientific work although the values for benchmarks range 0.3 to 0.5 ft higher than the NGVD values through the Lake Pontchartrain area. In 1979, the Corps of Engineers through a contractor ran levels around Lake Pontchartrain that approximate first

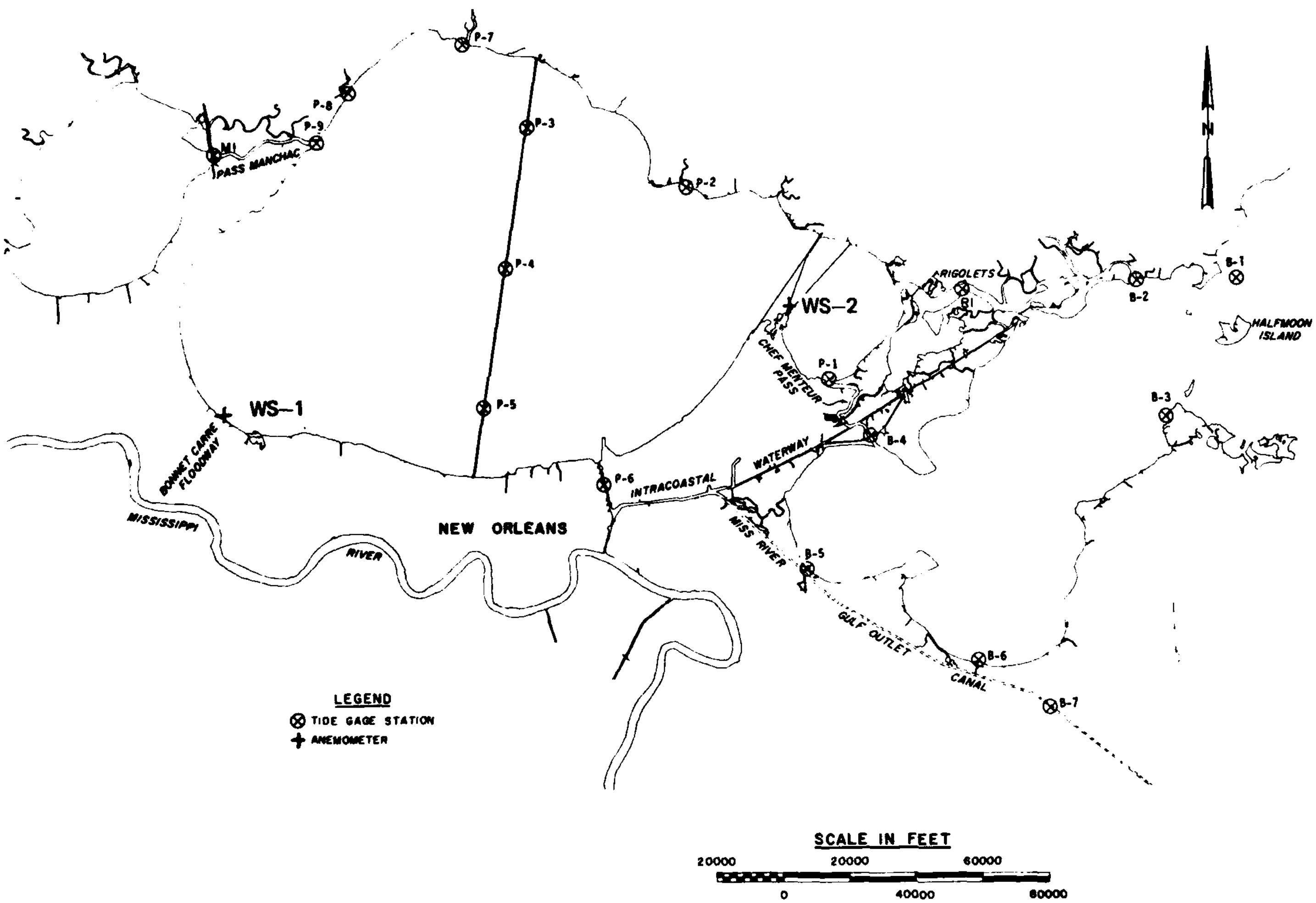

Figure 2. Location of tide gage and weather stations

order class 2 levels. These levels were corrected for curvature, refraction, rod calibrations, C-factor, and orthometric corrections. For these levels, the Simmesport Free Adjustment was chosen as the datum to provide an undistorted reference plane. The elevation data analysis was conducted prior to completion of the level survey and was conducted with the mean of the observed data record removed. An offset factor is required to convert elevation data plotted during analysis to elevations referenced to the Simmesport datum and should be added to the plotted elevation data when converting elevations to the Simmesport datum. Elevations referenced to Simmesport may be compared with elevations referenced to the Gulf Coast Low Water Datum (GCLWD) by using the relationship between mean low water at Shell Beach and the Simmesport datum. National Ocean Survey predicted high and low waters may be compared with high and low waters predicted from WES analysis results and the relationship between the mean low water elevation of each data set determined over the analysis period (154 days). Based on the comparison of mean low water levels over the analysis period, the GCLWD zero at Shell Beach is equivalent to +0.6 ft referenced to the Simmesport datum. Therefore, to convert data referenced to GCLWD to the Simmesport datum, subtract 0.6 ft from the GCLWD data. Survey elevation offsets at sta P-3 and P-8 were not consistent with known gage elevations relative to the lake surface and offsets are not included in Table 1 for these stations. The observed record at sta B-7 had numerous gaps during the observation period and a harmonic analysis was not conducted for sta B-7.

9. For the intensive data acquisition program, current meters (ENDECO Models 105 and 174) were installed at stations in The Rigolets, Chef Menteur Pass, MR-GO, and connecting canals to Lake Borgne, Intracoastal Waterway, IHNC, near the mouth of the Pearl River, Lake Pontchartrain, Tchefuncta and Tangipahoa Rivers, and in Pass Manchac. Current meter sta 1-21, designated by the prefix V, are shown in Figures 3 and 4. Current meter model, height above the local bottom, and number of meters installed at each station are given in Table 2. ENDECO Model 174 current meter data also include temperature and conductivity measurements.

10. ENDECO Model 174 current meters were installed at middepth in

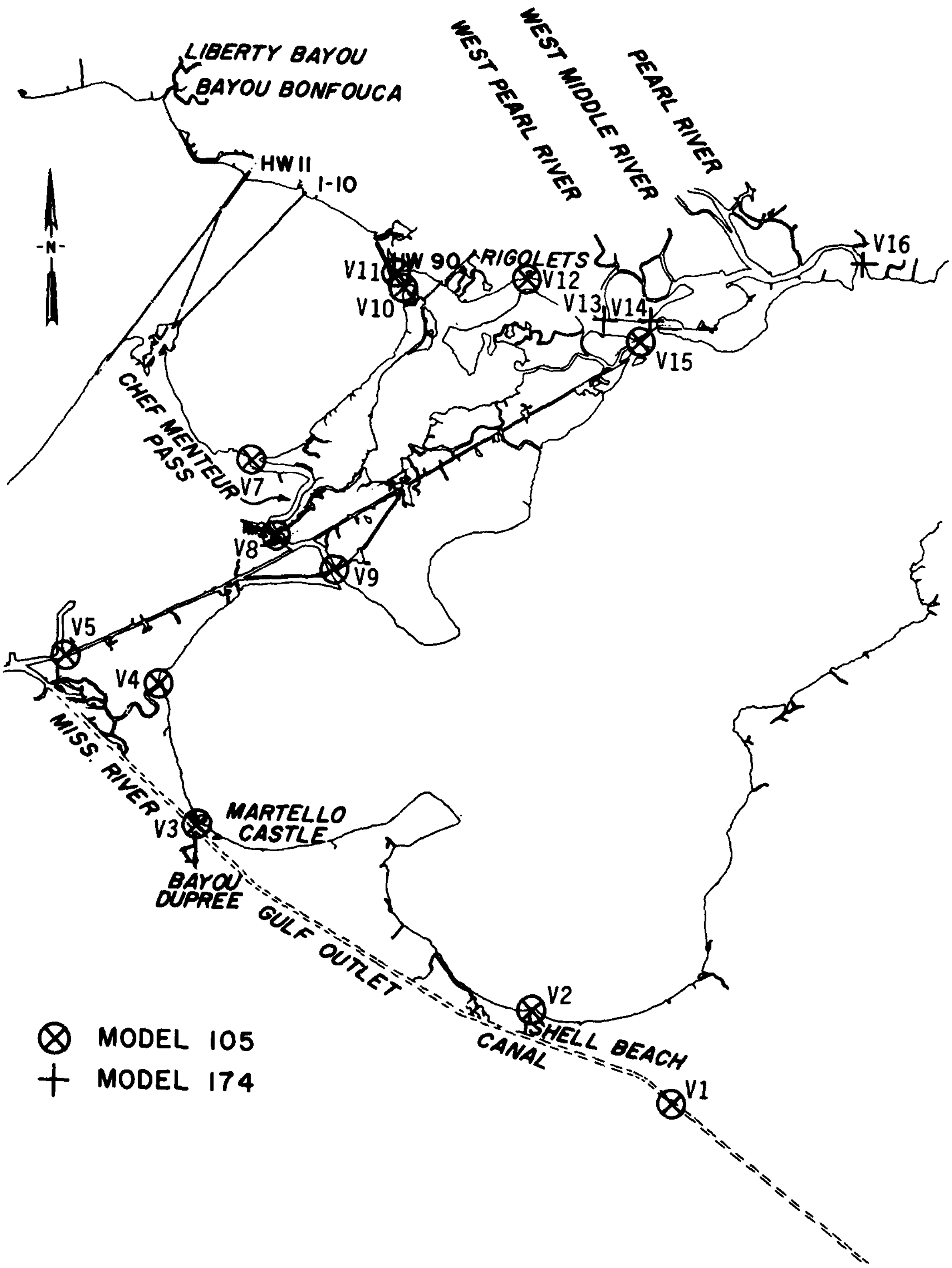

Figure 3. Location of Intensive Data Acquisition Program Current Meter Stations in the eastern part of the study area

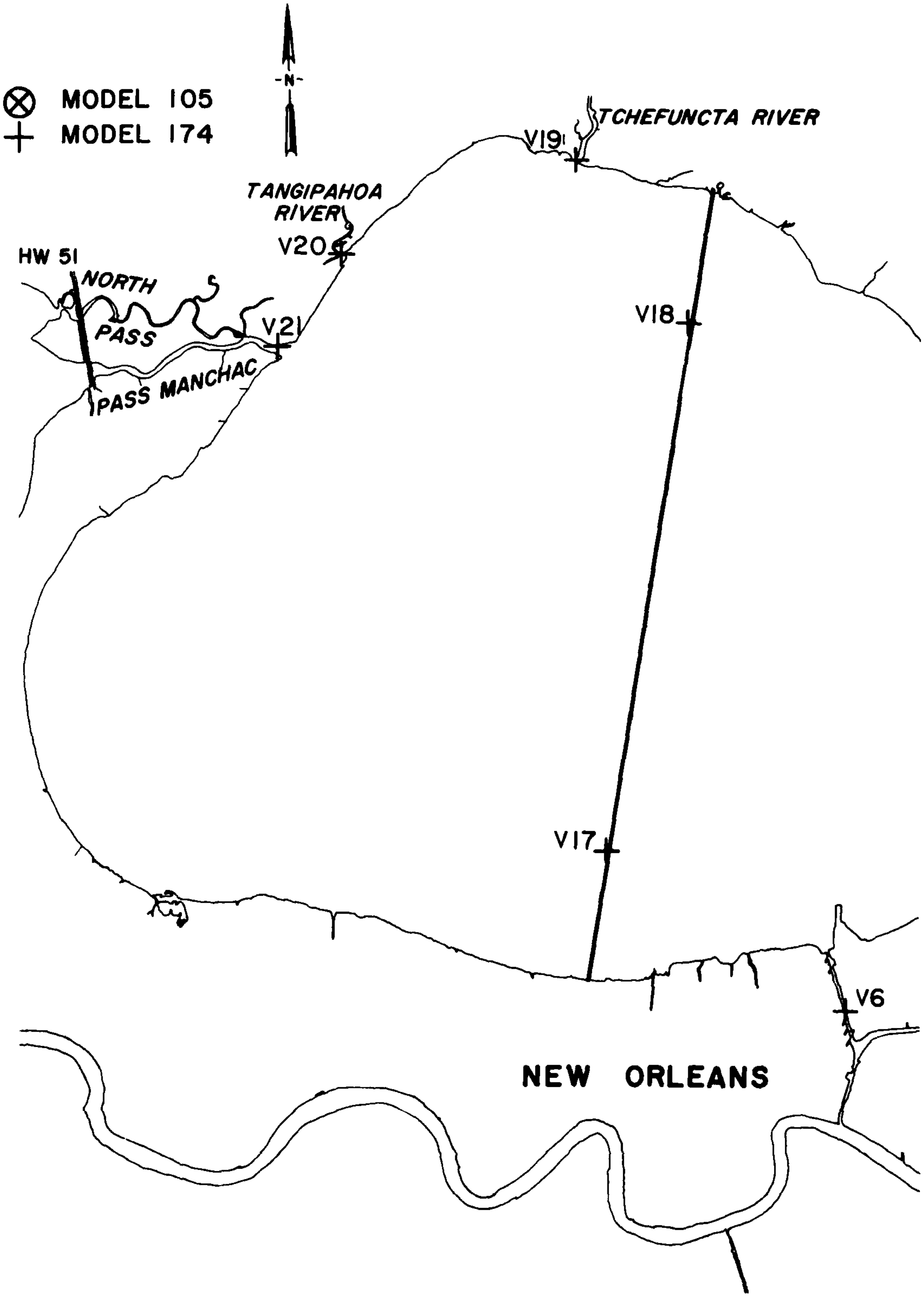

Figure 4. Location of Intensive Data Acquisition Program Current Meter Stations in the western part of the study area

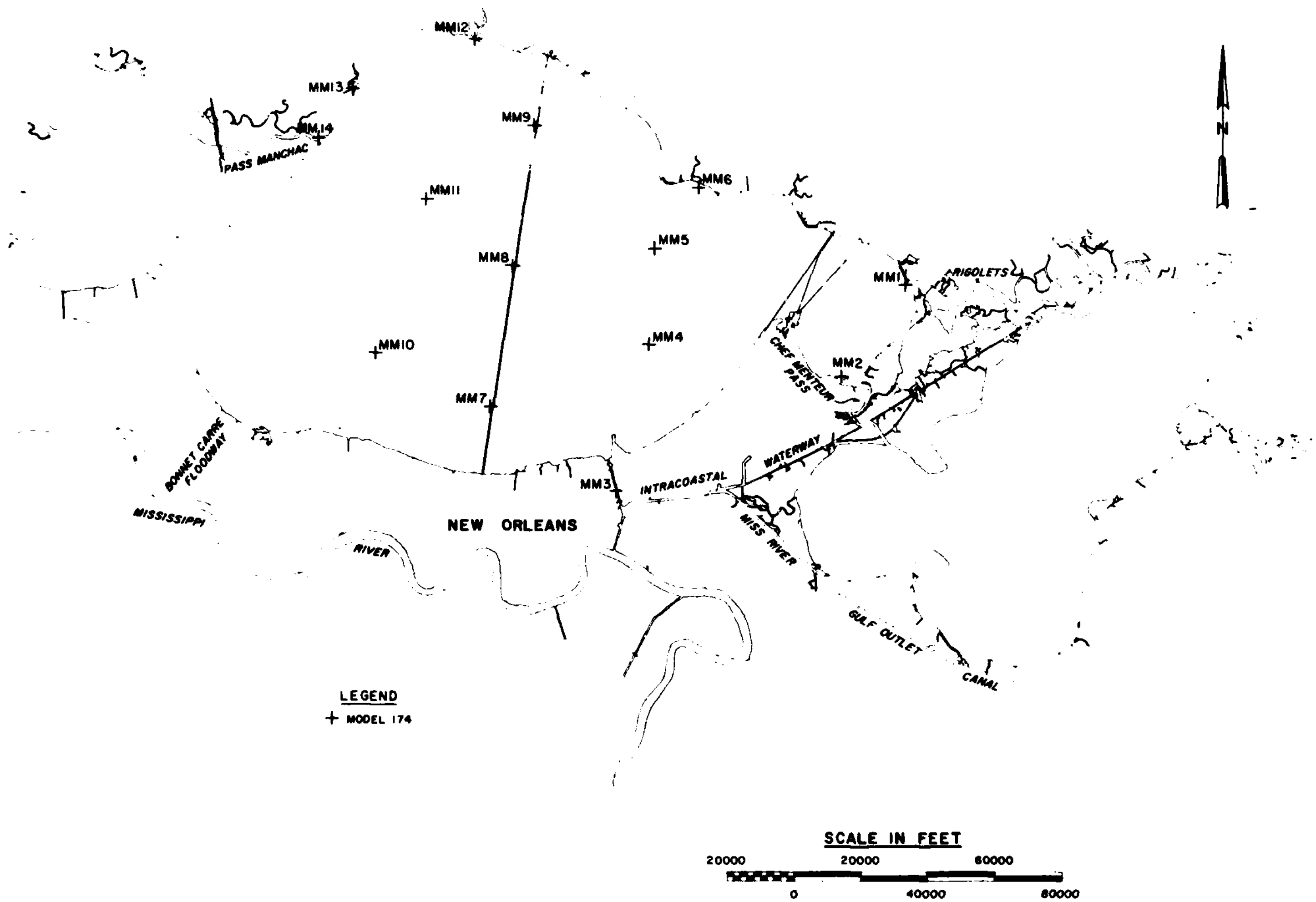

Figure 5. Water quality data acquisition program current meter stations

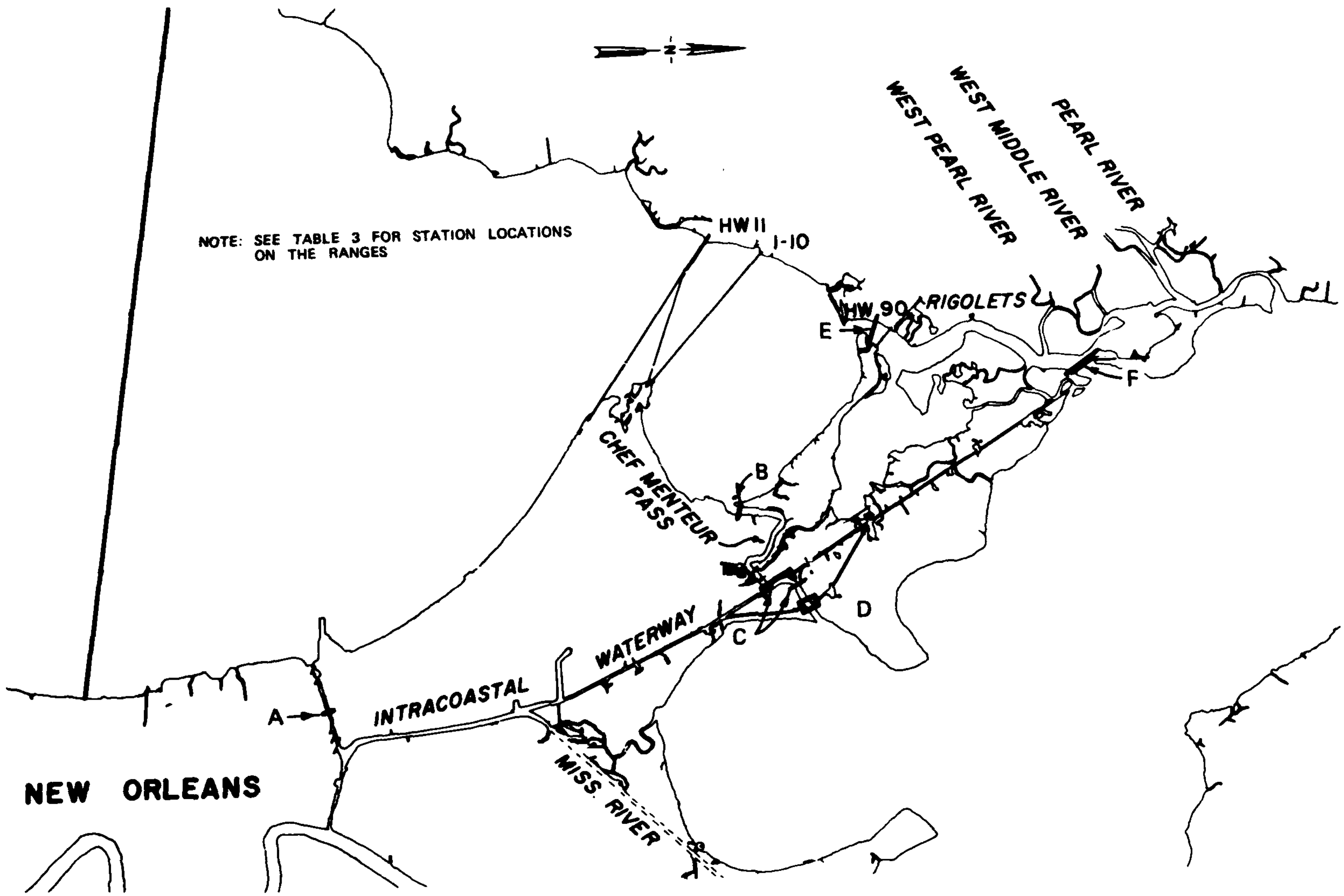

Figure 6. Range locations for the 25-hr currents survey

the water quality data acquisition program at 14 stations as shown in Figure 5. Station numbers are prefixed by MM. Station locations were selected to record the variation in temperature and conductivity within Lake Pontchartrain and the principal inflows to and discharges from the lake.

11. Weather stations WS-1 (5 and 10 m) near the southwest shore of Lake Pontchartrain and WS-2 (10 m only) near the east end of the lake are shown in Figure 2.

12. The six ranges (designated as A-F in Figure 6) in the 25-hour survey were selected to provide current, temperature, and salinity data in the IHNC, Chef Menteur Pass, and The Rigolets. Station locations in each range and approximate depth at each station are given in Table 3. Current data were taken near the surface, at middepth, and near the bottom at intervals of approximately 0.5 hr. Temperature and conductivity data also were taken along with each current reading.

13. Seventeen ranges were used in the conductivity, temperature, dissolved oxygen, and pH transect survey and are shown in Figure 7 together with station locations along each range. Transect data were collected near the surface, middepth, and near the bottom at each station except in shallow-water depths where only surface and bottom data were collected. Objectives and results of the transect survey are discussed in Appendix A. Observed transect conductivity and temperature data were recorded and are given in Appendix A in order to present the data as actually observed without further processing.

Duration of Synoptic Observations

Surface elevation

14. Tide gages were installed in the study area between 10 August 1978 and 10 October 1978 and remained in place for approximately one year. A bar chart showing time intervals during which each tide gage was operational during 1978-1979 is presented in Plate 1. Time intervals during which tide gages were out of service were normally due to either battery failure, mechanical punch or timer malfunction, or, in

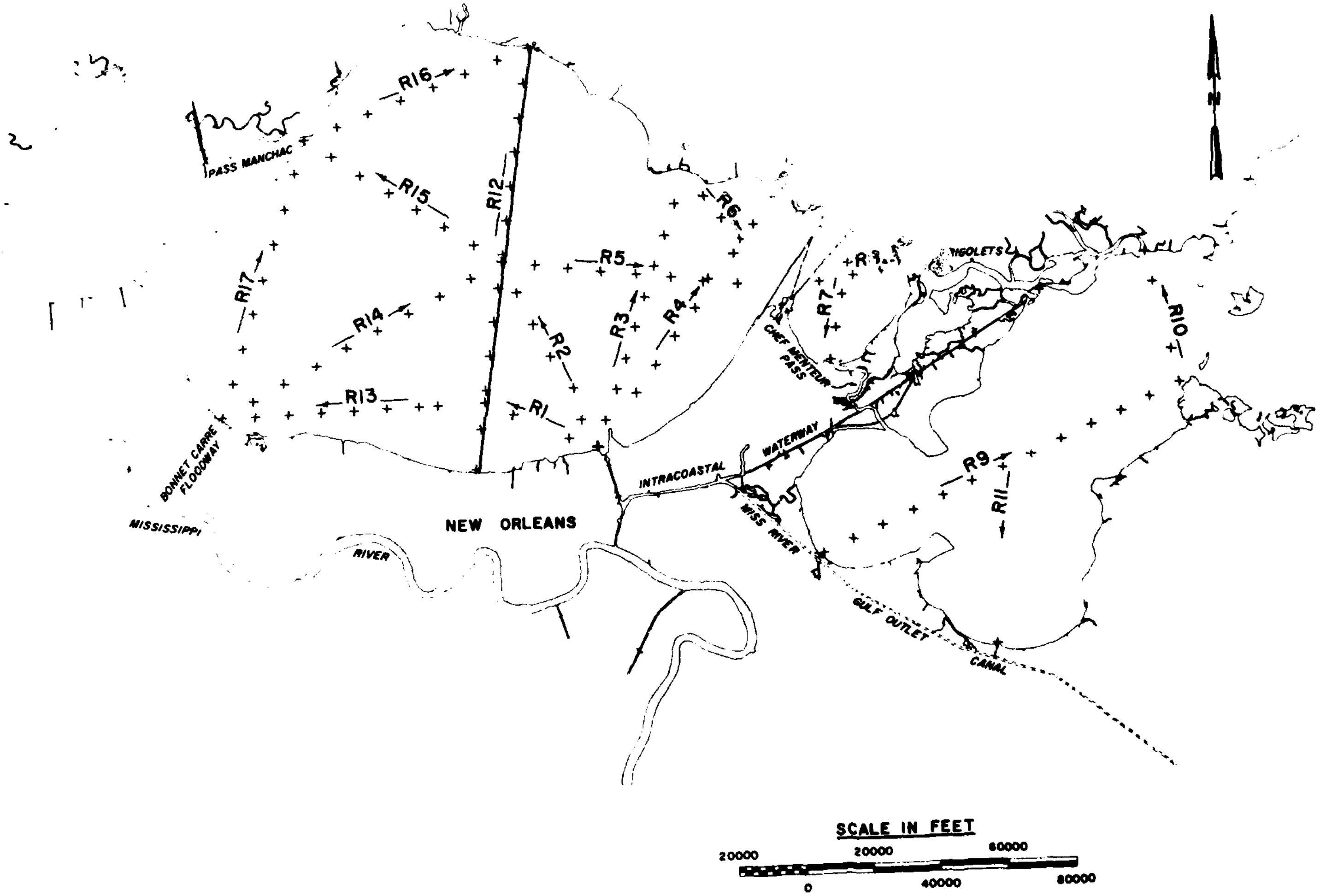

Figure 7. Water quality transect ranges

several cases, vandalism of the gage. As discussed in PART III, continuous tide records of approximately 182 days duration were used where possible in the harmonic analysis of tidal elevations. Continuous records of approximately 182 days were available for 11 gages and exceeded 150 days for 2 other gages. The remaining 5 records exceeded 85 days.

Current, temperature, and conductivity

15. Placement of velocity meters for the intensive data acquisition period started on 21 September 1978 and was completed on 5 October 1978. Placement of ENDECO Model 174 meters for the water quality program started 13 November 1978. Bar charts showing time intervals during which current data for Model 105 meters and current, temperature, and conductivity data for Model 174 meters were recorded at stations in the intensive and water quality data acquisition programs are presented in Plates 2-4.

16. During the intensive data acquisition program, incomplete or missing data from ENDECO Model 105 current meters were due to (a) loss of the meter, (b) displacement of the meter from the station location, or (c) meter malfunction. Complete records for the installation period are available from 10 of the 25 Model 105 meters. Partial records ranging from 4 to 30 days are available from an additional 11 meters. The status of Model 105 current data for each station location and comments concerning loss of data are given in Table 4.

17. Loss of current data from ENDECO Model 174 meters during the intensive program is related to (a) sticking of the directional digital compass, (b) sticking of the current meter impeller, or (c) meter internal malfunction. Sticking of the digital compass is related to the current meter trim and sticking of the current meter impeller is probably due to a combination of low currents and fouling of the impeller. Eight of the Model 174 meters were affected to some extent by these problems as noted in Table 4.

Wind speed and air temperature

18. Wind speed and direction and air temperature weather stations were installed at 5 and 10 m (16.4 and 32.8 ft) above the water surface

at sta WS-1 on 26 and 12 October 1978, respectively. A weather station was installed at 10 m at sta WS-2 on 19 October 1978. Time intervals during which data from each station were available are given in Table 5.

Supplemental Observations

Currents

19. Preliminary analysis of prototype current data collected during the intensive data acquisition program indicated that current data available in Chef Menteur Pass and the study area near the mouth of the Pearl River were limited and that a supplemental current data acquisition program was needed to improve the degree of confidence to be achieved in verification of the numerical tidal circulation model. Consequently, a supplemental current data acquisition program for approximately 30 days was conducted during August and September 1979. The 14 supplemental program station locations included C5-C16, C21, and C22. Except for sta C22 which was a completely new location, these stations were located near the corresponding V stations (Figures 3 and 4) and have the same numerical designation. Current meters were installed at middepth and, at sta C11 and C12 only, near the bottom. Current meter model, height above local bottom, and local depth are given in Table 6. The additional sta C22 was located in the MR-GO near Bayou Ducros midway between Bayou Bienvenue and Bayou Dupree. Station locations and analysis results are discussed in Appendix B.

Transect

20. A supplemental water quality transect survey also was conducted from 27 to 29 August 1979 to collect data more illustrative of summer seasonal conditions in Lake Pontchartrain. The supplemental transect survey included the same data as collected in the initial survey but with the number of transects decreased to ranges 2, 5, 7, 8, 12, 14, and 15. Results from the supplemental transect survey are discussed in Appendix A.

Significant Events During Data Acquisition Period

Bonnet Carre Floodway

21. During mid-April 1979, floodwaters from the Mississippi River entered Lake Pontchartrain through the Bonnet Carre Floodway. Four Model 174 current meter gage stations (MM1, MM2, MM3, and MM9) from the existing water quality data acquisition program, one Model 174 meter relocated from sta MM10 to sta MM10-A, and five additional Model 174 meter stations using relocated meters were selected to collect water quality data for potential use in an evaluation of the effects of floodwaters through the Bonnet Carre Floodway on current, temperature, and conductivity levels in Lake Pontchartrain. Data at the additional stations (MM15 through MM19) were collected through June 1979. Station locations in use from mid-April through June are shown in Figure 8. Sta MM10 was relocated to sta MM10-A at this time. Salinity data at 20 stations (S1-S14, S14-A, and S15-S19) were collected at approximately one-week to one-month intervals from April 1979 through August 1979 by WES and LMN but not all stations were included in each survey. Samples were collected from the surface, middepth, and bottom. Salinity data are shown for these stations since a specially designed conductivity meter with salinity readout only was used. Station locations are shown in Figure 9.

22. A description of the current, temperature, and conductivity regime in the lake during the period from mid-April through June is given in Appendix C.

Hurricanes Bob and Frederic

23. Hurricane Bob made landfall near Grand Isle, Louisiana, at Approximately 7 a.m. on 11 July 1979 and Hurricane Frederic made landfall near Mobile, Alabama, on 12 September 1979. WES tide gages, Figure 2, were operational during Hurricanes Bob and Frederic. The supplemental current survey was in progress during Hurricane Frederic. Anemometer data for wind speed, direction, and air temperature also were collected at both WES weather stations.

24. The effects of Hurricanes Bob and Frederic on water-surface elevations and currents in Lake Ponchartrain are designed in Appendix D.

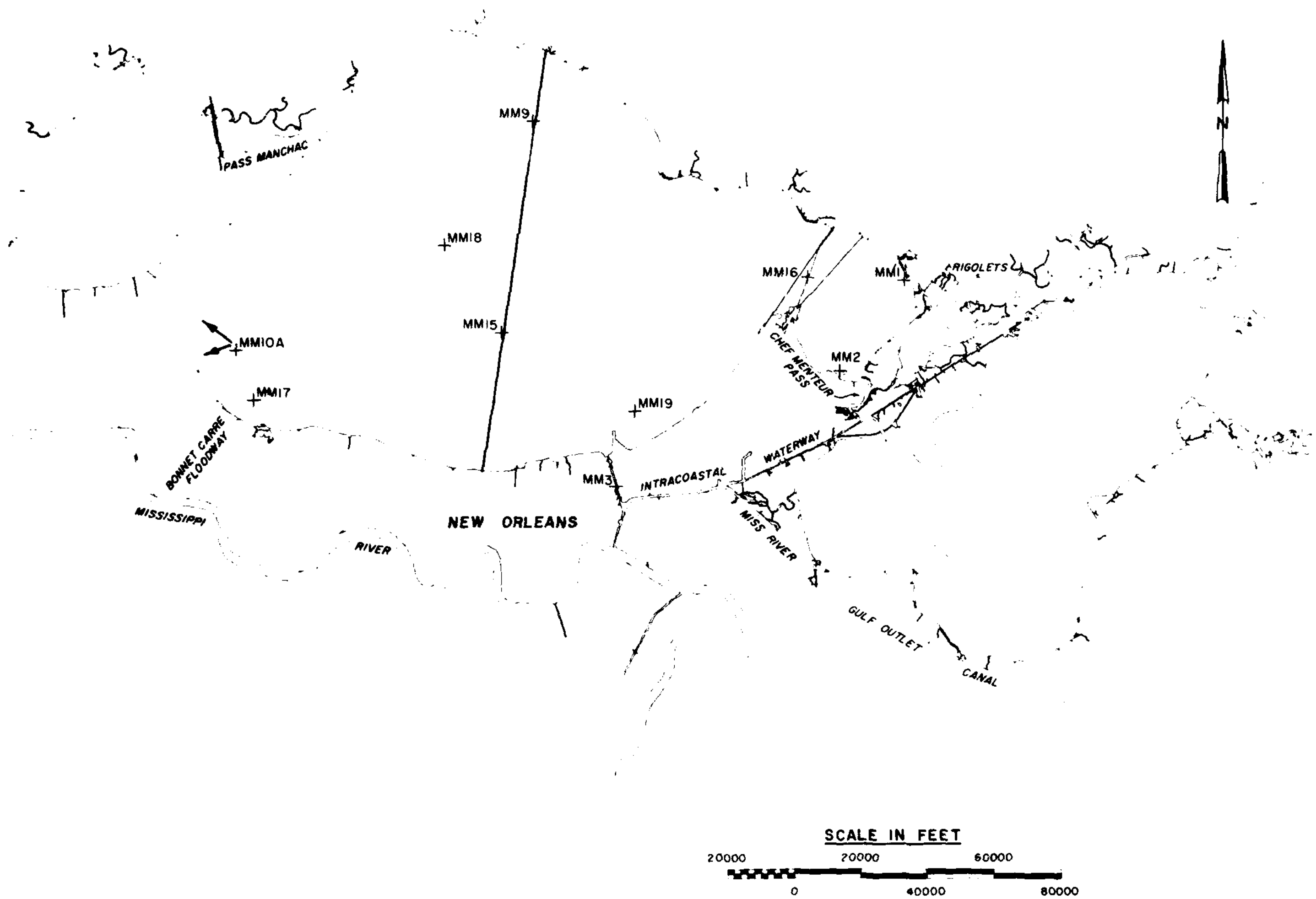

Figure 8. Location of additional Model 174 current meter stations

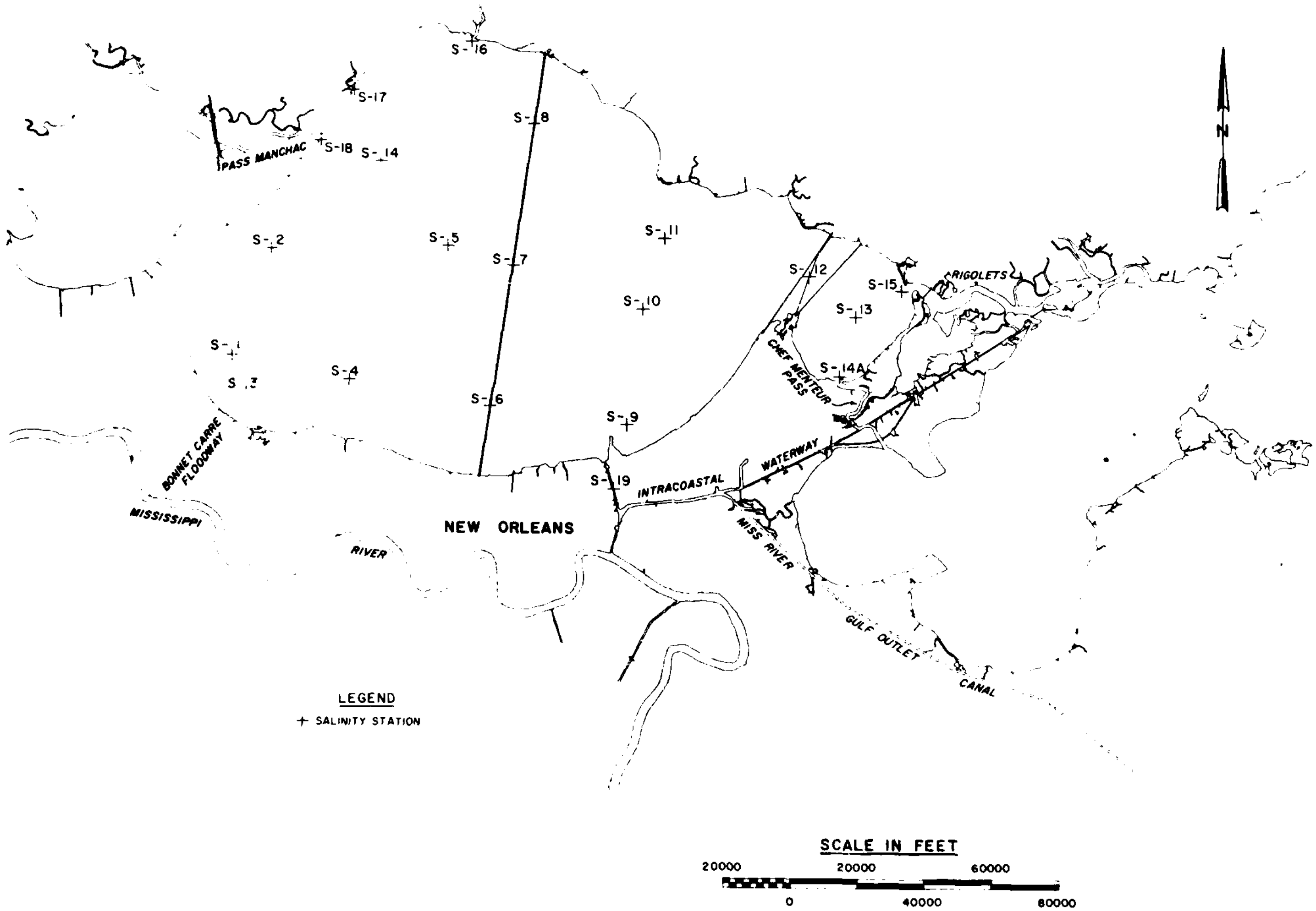

Figure 9. Station locations for salinity data

PART II: DATA ACQUISITION SYSTEM

Surface Elevation

25. Fisher and Porter Type 1550 surface elevation level recorders were used at all tide gage stations. The level recorder connects stilling well float position into a coded digital output and punches the digital value on paper tape at preselected time intervals (6 min for this study). The level recorder operates from a 7.5-v d-c battery power supply. The readout range is 0 to 99.99 ft and the readout accuracy is ±0.005 ft. The operating range is 50 ft. The level recorder is described in greater detail in Fisher and Porter Company Publication No. 19214 (Fisher and Porter Company).

26. The level recorder float operates in a 4-in.-diam vertical stilling well. The stilling well was designed to attenuate short-period fluctuations in the surface elevation of less than 1 min. The calculated response (Seelig 1977) for the stilling well is shown in Plate 5.

Currents, Water Temperature, and Conductivity

27. ENDECO Model 105 and 174 current meters used for current data acquisition in the study area are axial flow, ducted impeller, tethered meters designed specifically for use on the continental shelf and in estuarine areas. The Model 105 meter monitored current velocity only and recorded data on film. The Model 174 meter monitored temperature and conductivity as well and recorded data on magnetic tape. Range, accuracy, threshold, and resolution specifications for the current meters are:

	Model 105	Model 174
Current Velocity		
Sensitivity	53.7 rpm/knot	50.1 rpm/knot
Speed range	0.0-3.5 knots	0.0-5.0 knots
Impeller threshold	<0.05 knots	<0.5 knots

(Continued)

	Model 105	Model 174
Resolution	0.05 knot	0.4% of speed range
Speed accuracy	±3.0% full scale	±3.0% full scale
Current Direction		
Magnetic direction	0-360 deg	0-360 deg
Resolution	1 deg	1.4 deg
Accuracy	±7.2 deg above 0.05 knots	±7.2 deg above 0.05 knots
Temperature		
Range	--	-5°C to 45°C
Accuracy	--	±0.2°C
Resolution	--	0.098°C
Conductivity		
Range	--	5 to 55 millimhos/cm
Accuracy	--	±0.55 millimhos/cm
Resolution	--	0.098 millimhos/cm

The recording rate for the Model 105 and 174 meters was 30 min and 2 min, respectively.

28. Normally the current meters were tethered by a 5-ft line from the current meter to a mooring cable. The mooring cable was anchored at the bottom and suspended vertically by a submerged float attached to the top of the cable. After the start of the water quality survey, the mooring system for Model 174 current meters was modified to reduce tilting of the meter and consequent sticking of the digital compass at stations where currents were relatively low (usually less than 0.5 fps). In the modified mooring system, the current meter was connected directly to the mooring cable and a triangular brace connected from the top of the current meter pressure case immediately forward of the direction fins to a swivel clamp on the mooring cable. An ENDECO Model 174 current meter is shown in Figure 10 with the modified mooring system attached. The conductivity probe is shown mounted beneath the pressure case near the front of the meter.

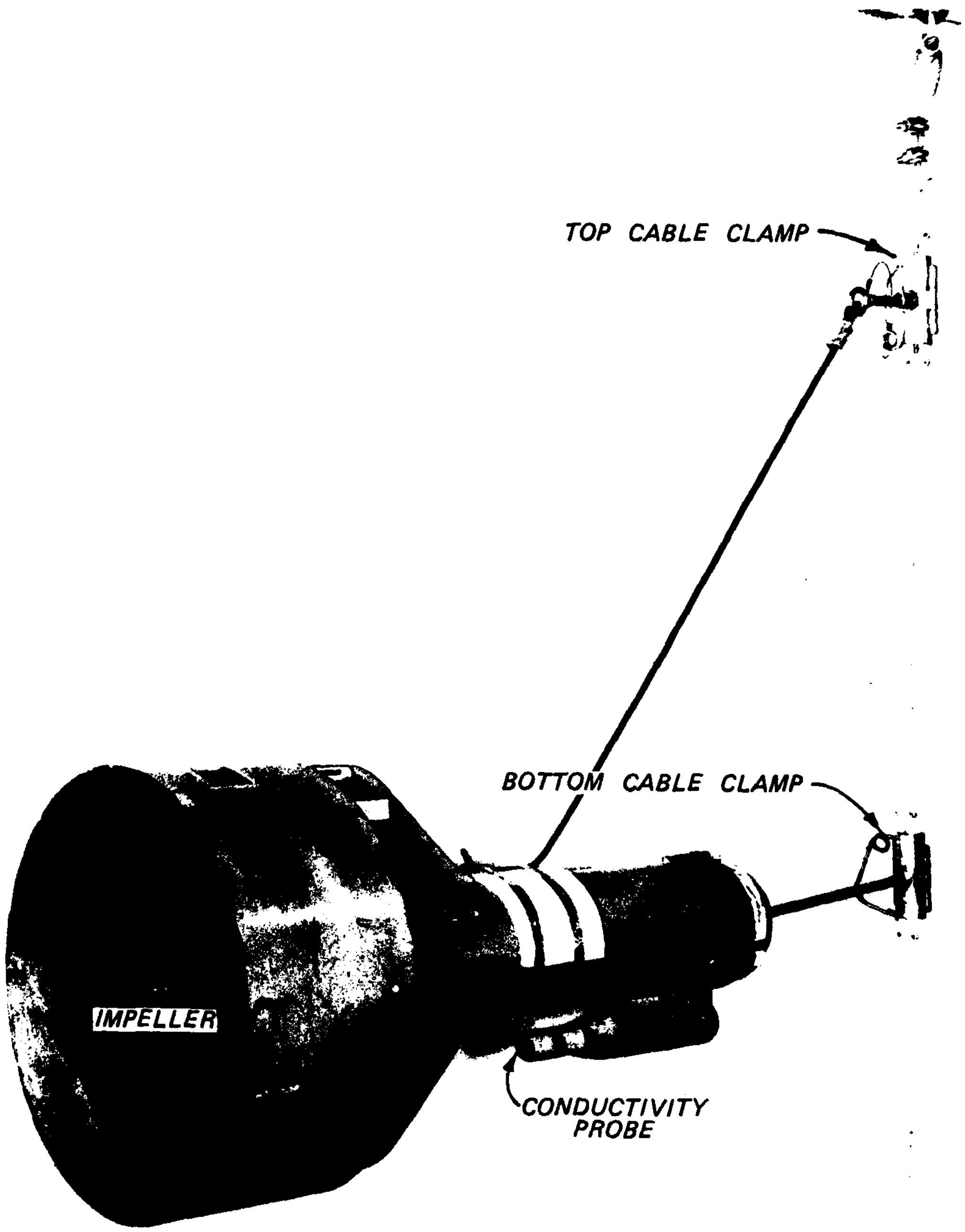

Figure 10. Modified mooring system for Model 174 current meters

Anemometer Data

29. Wind speed (run), wind direction, and air temperature were recorded using a Meteorology Research, Incorporated, Mechanical Weather Station with data recorded on strip chart. The wind speed (run) is measured by a cup anemometer, wind direction is sensed by a single blade aluminum vane, and temperature is sensed by a spiral coil bimetal element. Specifications for the weather station are:

Wind speed (run)	
Threshold	<0.75 mph
Accuracy	±2 percent
Range	0.75 to 100 mph
Temperature	
Range (selected)	-30 to +120°F
Absolute accuracy	±3°F
Relative accuracy	+1°F

30. A Hydrolab Surveyor Model 6D In Situ Water Quality Analyzer was used during transect water quality measurements. Specifications for the analyzer are:

Conductivity	
Range	0-100,000 mmhos/cm
Accuracy	±1.5 percent
pH	
Range	2-12 pH units
Accuracy	±0.05 pH units
Dissolved oxygen	
Range	0-22 ppm
Accuracy	±2 percent full scale
Temperature	
Range	-5°C to 45°C
Accuracy	±0.2°C between -5°C to 25°C ±0.4°C between 25°C to 45°C

Salinity concentrations of water samples taken during the 25-hr current

survey and observations during the operation of the Bonnet Carre Flood Control Structure were determined by the use of conductivity cells especially built and calibrated for this purpose. The cells were considered to be accurate to within ±2 percent of full range, which amounts to about ±0.2 parts per thousand (ppt) in the lower ranges of salinity and ±0.5 ppt in the higher ranges of salinity.

PART III: TIDAL DATA ANALYSIS

Harmonic Analysis

Approach

31. Similar analysis techniques were used for both the surface elevation and current data. The following steps were included in the analysis procedure:

- a. Edit to remove data spikes and mean of the data record.
- b. Filter to remove high- and low-frequency trends from the data.
- c. Harmonic analysis for tidal constituents.
- d. Analysis of data residual.

Data editing

32. Editing of surface elevation data was necessary to correct for spikes in the data record and to fill in short sequences of missing data. Occasional spikes in the data record normally occurred due to slight misalignment between adjacent punches in the paper tape causing the paper tape reader to misinterpret the punched data. Missing data sequences (2 or 3 points) usually occurred during servicing of the tide gage and limited missing data sequences were inserted using linear interpolation. In the edit procedure, the proper time phase relationship of the data was maintained. ENDECO Model 105 current data were read from the film record by ENDECO and additional editing was unnecessary. Model 174 current data were read from magnetic tape at WES. Data were placed on the magnetic tape at hourly intervals by the current meter, and occasionally, an hourly record did not properly record. In these cases, missing data were inserted using linear interpolation or a spline interpolation, as appropriate.

Digital filter

33. A digital band-pass filter was applied to attenuate high and low frequencies in the surface elevation and current data. The period range considered in the harmonic analysis was approximately 3 to 28 hr. Short-term trends, less than 3 hr, can be caused by changes in the wind

field due to local thunderstorms moving across the study area. Trends longer than 28 hr may be caused by river outflows, persistent winds of longer duration, or general raising or lowering of the Gulf near the study area due to large-scale meteorological effects.

34. An eight-pole Butterworth filter, characterized by a smooth power gain with maximum flatness in the passband and the stop band along with a reasonably sharp cutoff, was applied to the surface elevation and current data. Power gain, the squared amplitude response, for the filter is shown in Plate 6. Half-power frequencies are $1.85(10^{-4})$ H_z and $0.0842(10^{-4})$ H_z or 1.5 hr and 33 hr, respectively. The start and end of each data record were affected by the filter and approximately 50 hr were deleted for the start and end of each data record during analysis.

Least squares harmonic analysis

35. Elevation of the prototype tide at a station can be represented (Schureman 1958) by

$$h(t) = H_o + \sum_{i=1}^{J} f_i H_i \cos \left[\bar{a}_i t + (V_o + u)_i - K_i\right] \qquad (1)$$

where

h = elevation at time t

t = time reckoned from some initial epoch

H_o = mean height above reference datum

J = total number of constituents

f_i = factor to reduce mean amplitude to year of prediction

H_i = mean amplitude of i^{th} constituent

$\bar{a}_i$ = angular speed of i^{th} constituent

$(V_o + u)_i$ = equilibrium argument of the i^{th} constituent for $t = 0$

K_i = local epoch of i^{th} constituent

The coefficients f_i , $\bar{a}_i$, and the equilibrium $(V_o + u)$ can be obtained from tables (Schureman 1958). Equation 1 may be rewritten as

$$h(t) = H_o + \sum_{i=1}^{J} A_i \cos(\omega_i t + \phi_i) \tag{2}$$

where

$A_i = f_i H_i$ = amplitude of the i^{th} constituent

ω_i = angular frequency of the i^{th} constituent

ϕ_i = phase of the i^{th} constituent

36. Observed prototype surface elevation data h_p can be represented as

$$h_p(t) = \overline{h}_p(t) + e(t) = a_o + \sum_{i=1}^{J} a_i \cos(\omega_i t) + b_i \sin(\omega_i t) + \varepsilon(t) \tag{3}$$

where

$\overline{h}_p$ = the calculated tidal elevation represented by a harmonic series of known frequencies

$\varepsilon(t)$ = noise in observed data

a_o, a_i, and b_i = coefficients

The noise level is not known and the unknown coefficients (amplitudes and phases) are solved for by minimizing the variance of the sum of the squared difference between the observed prototype tidal elevation data and the form represented by Equation 2 using a least squares procedure.

37. The least squares procedure* minimizes the variance E such that

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* Kent A. Turner and Donald L. Durham. Unpublished (on file at WES). "Documentation of Wave Height and Tidal Analysis Programs for Automated Data Acquisition and Control Systems," U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

$$E = \sum_{n=1}^{N} \varepsilon^2(n\Delta t) = \sum_{n=1}^{N} \left[\overline{h}_p(n\Delta t) - h_p(n\Delta t)\right]^2 \rightarrow \text{minimal} \tag{4}$$

where N is the total number of data samples and Δt is the time interval between consecutive samples. To minimize the variance, set

$$\frac{\partial E}{\partial a_i} = 0 , \quad i = 1,\ldots,J \tag{5}$$

and

$$\frac{\partial E}{\partial b_i} = 0 , \quad i = 1,\ldots,J \tag{6}$$

or, from Equations 3 and 4, Equation 5 can be written

$$\frac{\partial E}{\partial a_i} = \frac{\partial}{\partial a_i} \left\{ \sum_{n=1}^{N} \left\{ \left[\overline{h}_p(n\Delta t)\right]^2 - 2\,\overline{h}_p(n\Delta t) \cdot \left\{ \sum_{i=1}^{J} \left[a_i \cos(\omega_i n\Delta t) + b_i \sin(\omega_i n\Delta t)\right] \right\} + \left\{ \sum_{i=1}^{J} \left[a_i \cos(\omega_i n\Delta t) + b_i \sin(\omega_i n\Delta t)\right] \right\}^2 \right\} \right\} = 0 \tag{7}$$

Equation 6 may be expressed similarly. Combining terms, Equations 5 and 6 becomc

$$\frac{\partial E}{\partial a_i} = \sum_{n=1}^{N} \left\{ -2\,\overline{h}_p(n\Delta t) \cdot \sum_{i=1}^{J} \cos(\omega_i n\Delta t) + 2\cos(\omega_i n\Delta t) \cdot \sum_{i=1}^{J} \left[a_i \cos(\omega_i n\Delta t) + b_i \sin(\omega_i n\Delta t)\right] \right\} = 0 \tag{8}$$

and

$$\frac{\partial E}{\partial b_i} = \sum_{n=1}^{N} \left\{ -2\, \overline{h}_p(n\Delta t) \cdot \sum_{i=1}^{J} \sin(\omega_i n\Delta t) + 2 \sin(\omega_i n\Delta t) \right.$$

$$\left. \cdot \sum_{i=1}^{J} \left[a_i \cos(\omega_i n\Delta t) + b_i \sin(\omega_i n\Delta t) \right] \right\} = 0 \tag{9}$$

Equations 8 and 9 form a set of simultaneous equations that may be solved for a_i and b_i.

37. For each tidal constituent, the amplitude A_i and the phase $\emptyset_i$ can be determined from

$$A_i = \left(a_i^2 + b_i^2\right)^{1/2} \tag{10}$$

and

$$\emptyset = \arctan\left(\frac{b_i}{a_i}\right) \tag{11}$$

Results from the least squares analysis may then be expressed as the tidal amplitude and local epoch.

Tidal Constituents

38. Tidal constituents in the data analysis included diurnal, semidiurnal, and shallow-water overtide components and were:

Harmonic Constituent	Symbol	Period, hr
Principal lunar diurnal	O1	25.82
Lunisolar diurnal	K1	23.94
Principal solar diurnal	P1	24.07
Larger lunar elliptic	Q1	26.87
Smaller lunar elliptic	M1	24.84
Small lunar elliptic	J1	23.10

(Continued)

Harmonic Constituent	Symbol	Period, hr
Principal lunar	M2	12.42
Principal solar	S2	12.00
Larger lunar elliptic	N2	12.66
Lunar overtides	M4, M6, M8	6.21, 4.14, 3.11

39. Previous harmonic analyses by the Coast and Geodetic Survey (1942) of tidal elevation data from several stations in and near Lake Pontchartrain indicated that the principal tidal components were the diurnal constituents K1, O1, P1, and the semidiurnal constituents S2 and M2.

PART IV: ANALYSIS RESULTS

Tidal Elevations

Surface elevation observations

40. Typical observed tidal ^levation data (edited to remove any spikes and to fill in data during service intervals) for approximately six months from gages B-6, R-1, and P-4 are shown in Plates 7-12, 13-19, and 20-26, respectively. Tidal elevation observations at tide gages B-6, R-1, and P-4 start near mid-August 1978 and are typical of the surface elevation data for Lake Borgne, The Rigolets, and the central part of Lake Pontchartrain, respectively. The data ranges are 4.0, 3.7, and 3.6 ft, respectively, and show the effect of both tidal fluctuations and low-frequency trends in the data. The general fall in water-surface elevation near day 287 and the general rise in surface elevation near day 303 are typical of the low-frequency trends. The long-term trends are more apparent in the gage P-4 data where the tidal range is smaller. The fall and rise of the water surface for these two cases occurred coincident with maximum hourly average winds at weather station WS-1 (10 m height) of 20 to 25 mph from the north to north-northwest and from the east, respectively.

41. Short-term high-frequency fluctuations in water-surface elevation also are more apparent in the gage P-4 data. The high-frequency fluctuations, such as those that occurred between days 232 and 242, correlate well with scattered heavy thundershowers and thunderstorms, as well as tropical storm Debra which entered coastal southwest Louisiana on day 241.

42. Observed and filtered tidal elevation data have been plotted by removing the mean elevation of the observed record to establish a zero gage reference, because the harmonic analysis for tidal constituents was conducted prior to completion of the tide station level survey. With the exception of sta B-7, P-3, and P-8, an offset factor, discusse in paragraph 8 and given in Table 1, is required to match the plot zero gage reference to the elevation of th station referenced to

the Simmesport datum. For example, plotted elevation data at sta B-6 should be increased by 1.43 ft to change the plotted zero gage reference for the data to the free plane datum (Simmesport Free Adjustment) required for comparison with other gages. The elevation records are not of sufficient length to establish mean sea level at the station locations.

Harmonic analysis

43. Filtered surface elevation data for the 17 tide gage stations used in the harmonic analysis are shown in Plates 27-124. Times of spring and neap tide are readily apparent in the filtered data as well as the diurnal nature of the tide. Surface elevation data calculated from the harmonic analysis results also are included for comparison with observed data. In general, calculated data cannot be distinguished from observed data except near neap tide periods where meteorological effects have a relatively larger influence on elevations due to the decreased tidal range. The start date, end date, and length of record for each tide gage used in the harmonic analysis are given in Table 7. The record length was 182 days for 11 gages, between 156 and 160 days for 3 gages, 85 days or longer for 2 gages, and 53 days for the remaining gage.

44. Tidal amplitudes for diurnal constituents O1 and K1 are shown in Figures 11 and 12. The phase lag of each constituent relative to tide gage B-2, located in Lake Borgne at the mouth of the Pearl River, also is shown for O1 and K1. The amplitude of the two constituents was approximately 0.3 to 0.4 ft (dependent on location) to Lake Borgne and decreased to approximately 0.10 ft in Lake Pontchartrain and 0.05 ft in Lake Maurepas. Travel time for the two constituents from tide gage B-2 through Lake Pontchartrain and Pass Manchac to tide gage M-1 was approximately 11 hr with the tide traveling in a general east-west direction.

45. Similar data for the P1 constituent are shown in Figure 13. However, the amplitude of the P1 constituent is relative' small (approximately one-third of the K1 constituent amplitude) and varies from near 0.15 ft in the Lake Borgne area to approximately 0.03 ft in Lakes

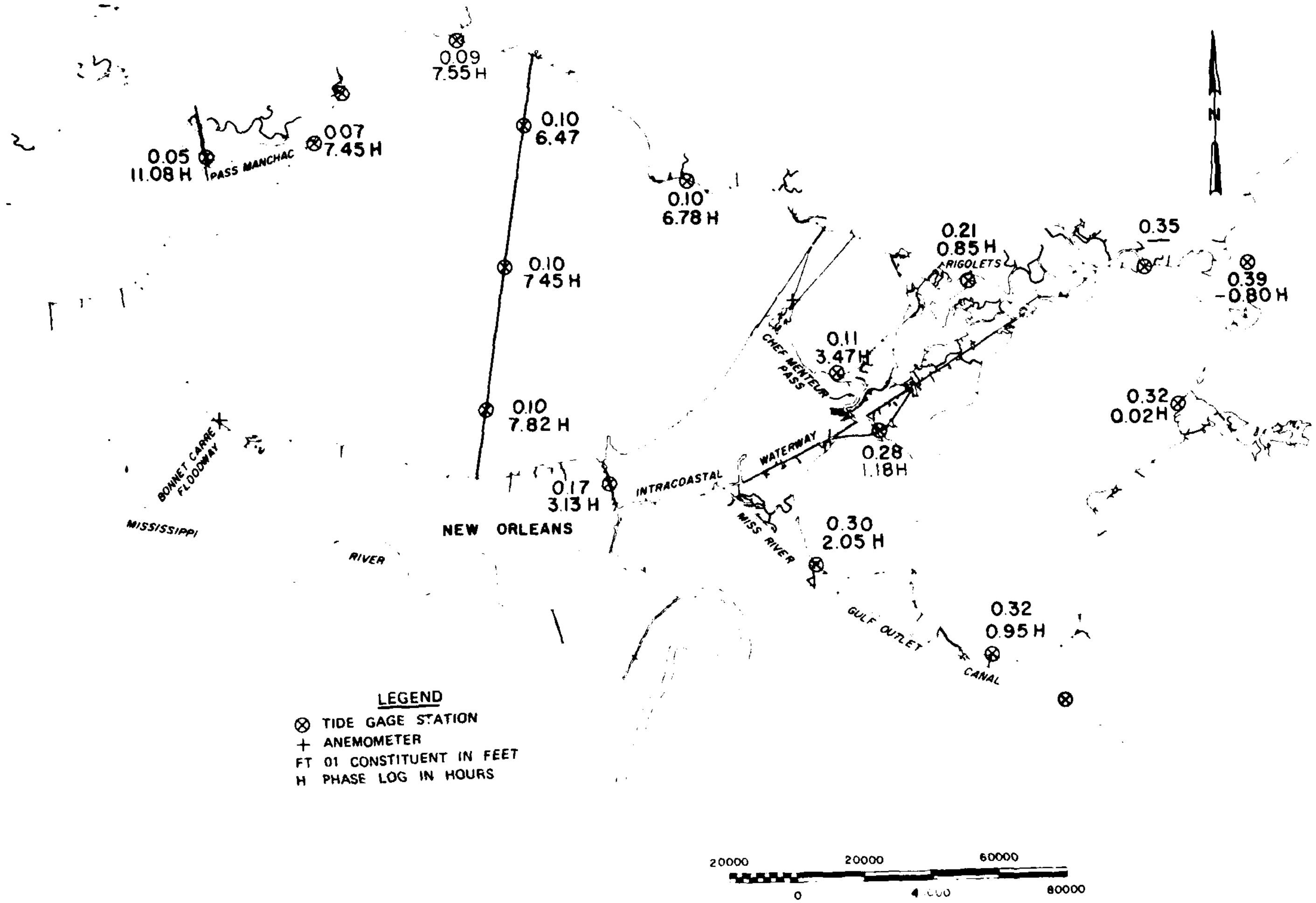

Figure 11. Amplitude of the O1 constituent in feet and phase lag from sta B-2 in hours

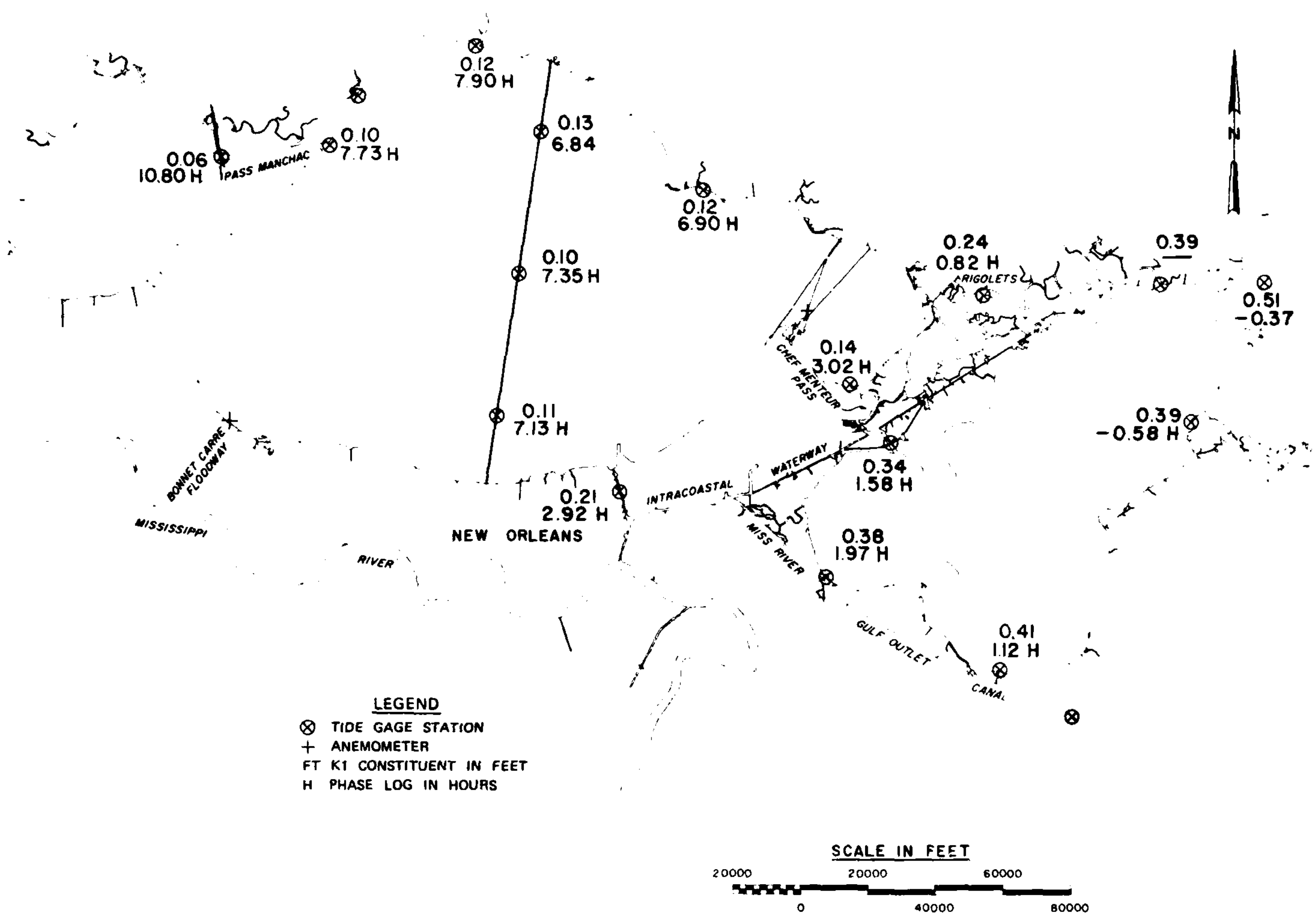

Figure 12. Surface elevation amplitude of the K1 constituent in feet and phase lag from sta B-2 in hours

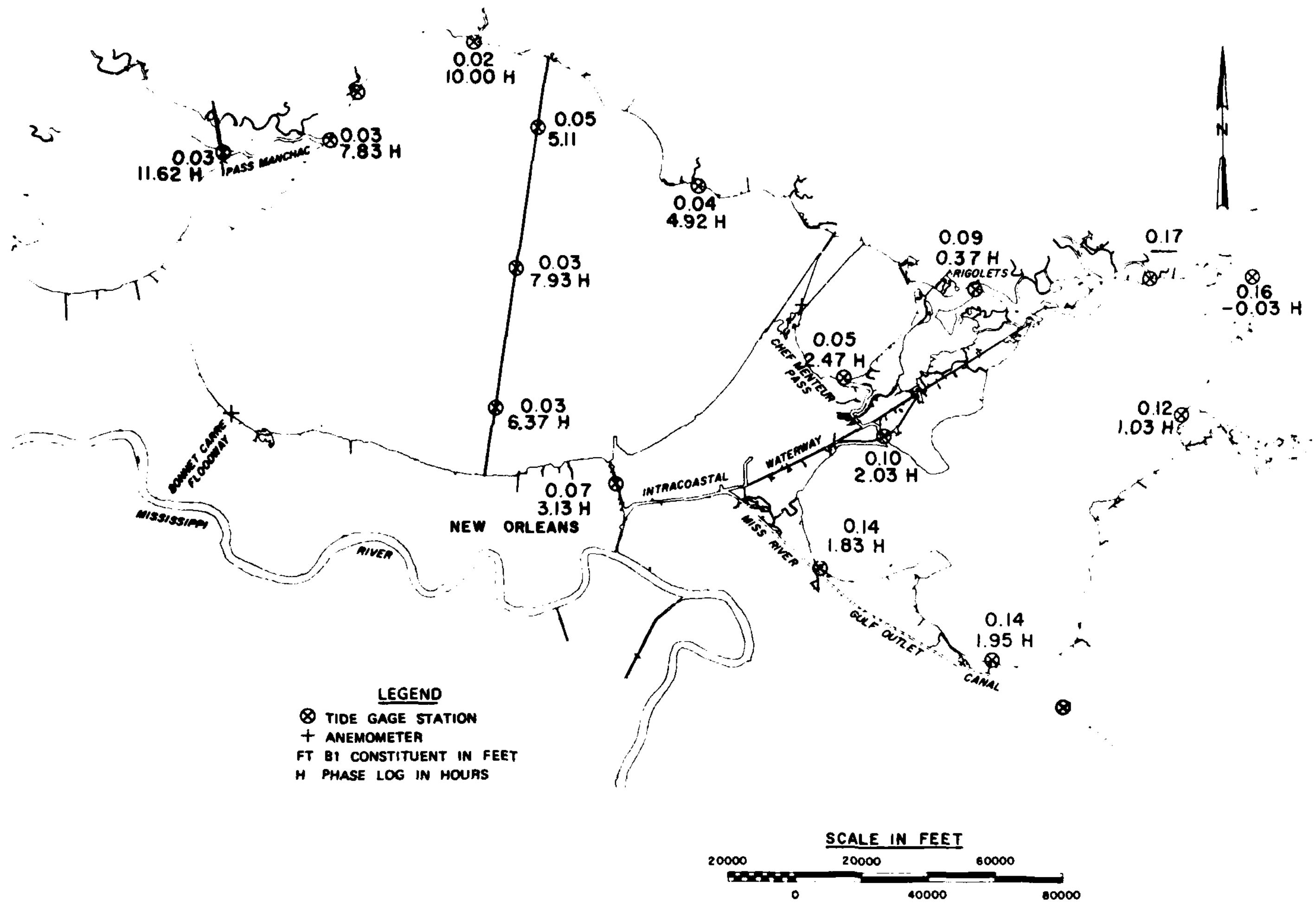

Figure 13. Surface elevation amplitude of the P1 constituent in feet and phase lag from sta B-2 in hours

Pontchartrain and Maurepas. Due to the relatively small amplitude of the P1 constituent in Lake Pontchartrain, phase lag is not as well defined for P1 as the O1 and K1 and is not quite as consistent.

46. Analysis results for the O1, K1, and P1 constituents indicate the formation of a co-oscillating tide or a forced oscillation in Lake Pontchartrain with a general rise and fall of the water level over the lake. The general rise and fall of the lake results in a similar phase lag being observed for the O1 and K1 constituents along the causeway bridge and at the eastern end of Pass Manchac.

47. Calculated amplitudes at each tide gage for all constituents analyzed are given in Table 8. The larger semidiurnal constituents, M2 and S2, decrease from approximately 0.05 to 0.10 ft in Lake Borgne to about 0.01 ft in Lake Pontchartrain. Amplitude of the Q1 diurnal constituent varies from about 0.10 to 0.05 ft in Lake Borgne to 0.02 ft in Lake Pontchartrain. Amplitudes of the less significant constituents are negligible in Lake Pontchartrain (less than 0.02 ft) and are not shown. Amplitude data for the M4, M6, and M8 overtides indicate they are not significant (less than 0.02 ft) in the study area. The root-mean-square (rms) value of the residual after analysis also is given in Table 8. Average constituent amplitudes corrected for the 1978 node factor (Schureman 1958) are given in Table 9 and local epoch data are given in Table 10.

Length of record

48. Harmonic analysis of surface elevation records for tide gages P-4 and B-3 were conducted for record lengths of 60, 90, 120, and 150 days for comparison with results of the 182-day analysis. Tide gage B-3 data are representative of Lake Borgne and tide gage P-4 data are representative of Lake Pontchartrain. Analysis results for calculated constituent amplitude and phase differences from the 182-day analysis are given in the following tabulation for constituents O1, K1, and P1:

		Constituent					
	Record	01		K1		P1	
Tide Gage	Length days	Amplitude ft	Phase min	Amplitude ft	Phase min	Amplitude ft	Phase min
P-4	60	0.02	6	0.02	3	--	103
	90	0.02	16	0.03	23	0.01	137
	120	0.01	8	0.02	4	--	88
	150	--	3	0.01	2	-0.01	38
B-3	60	0.01	-3	-0.05	-38	+0.08	5
	90	--	4	-0.05	-16	+0.04	-2
	120	-0.01	-9	-0.03	-8	+0.02	14
	150	--	-1	-0.01	-4	+0.01	15

The 60-day analysis is sufficient for the 01 constituent in Lake Borgne with relatively small variation in phase. To define the amplitude and phase K1 and P1 reasonably accurately, however, a record length of approximately 120 days or longer appears necessary. In Lake Pontchartrain, the effect of record length on phase of the P1 constituent is quite evident and indicates that a 182-day record is necessary for proper phase definition where tidal amplitudes are relatively small. Differences in analysis results using different record lengths for the K1 and P1 constituents are due to adjustment of the K1 and P1 amplitude and phase in the harmonic analysis to obtain a slightly improved least-squares fit to the observed data due to the presence of noise or nontidal energy near the K1 and P1 period in the record. Consequently, since this noise is caused by some other forcing function such as the wind, the longer the record, the more likely that the least-squares harmonic analysis will not be significantly contaminated by the noise.

Tidal Currents

Current observations

49. Prototype current data (unedited) from 16 stations with record lengths sufficient for a constituent analysis are shown in Plates 125-204 and include sta V1 through V6, V8-S, V10-S, V11-S, V11-M,

V11-B, V12-S, V12-M, V12-B, V13, and V21-S. Model 174 current meters were used at sta V6, V13, and V21-S. The data recorded at V20 were too short for adequate analysis. Current data plates for each station include a current direction summary diagram, current flood and ebb magnitude, current direction, component of the flood and ebb velocity along the average direction of flow, and current component normal to the average flood and ebb direction. Record lengths for the current meters are shown in Plate 2. For both Model 105 and 174 data, the ebb and flood flow was primarily diurnal. The Model 174 current data were generally not as smooth as the Model 105 data due to the shorter recording interval and the turbulent fluctuations of the current. Record lengths for these stations varied from approximately 3 weeks to 6.5 weeks.

50. Times at which spring and neap tides occurred were not as apparent in current data as in surface elevation data. However, as shown by the observed current data, maximum currents were smaller during neap tides such as near Julian days 273 and 287, for example. Day 273 also corresponds closely with a general rise and fall of water-surface elevation in the study area occurring over approximately 6 days.

51. In The Rigolets, maximum currents during the observation period occurred at the three surface gages and were 2.9 fps at both sta V10-S and V12-S and 2.3 fps at V11-S. At the Lake Pontchartrain entrance of The Rigolets, current data from the north shore at V11-S and V11-M indicated that flood and ebb flows to and from the lake varied slightly in direction with the general direction of flood flow being approximately west-northwest and the direction of ebb flow being approximately east. (That is, the direction of ebb flow was about 158 deg different than the flood direction, rather than 180 deg different.) The change in direction from flood to ebb correlates well with the meter location near a bend to the west as The Rigolets channel enters Lake Pontchartrain. Flood flow into the lake follows the west-northwest direction of the channel and the ebb flow tends to flow along the east-west orientation of the channel west of the meter's location. Maximum amplitude of flood flows are approximately twice ebb flows at the V11 station location. However, at V10-S along the south shore of The

Rigolets, the velocity data summary (Plate 160A) indicated that maximum ebb currents exceeded maximum flood currents by approximately 50 percent. The difference in direction between ebb and flood currents along the north side of The Rigolets did not occur at V10-S; however, ebb currents were more variable in direction than along the north shore. Near the center of The Rigolets along the north side at sta V12, maximum flood and ebb currents were approximately equal with little variation in the average flood-ebb direction at the surface and middepth. Near the bottom at V12, the flood-ebb direction shifted approximately 25 deg from west-northwest to the northwest. Sta V12 was located near the deepest part of The Rigolets with depths in excess of 60 ft mean low water (mlw).

52. At sta V13 (Plate 42), near The Rigolets entrance of the mouth of the West Pearl River, maximum observed flood currents were approximately 0.9 fps and maximum ebb currents were near 1.8 fps with little variation in current direction between flood and ebb.

53. At sta V8-S (Plate 34) in Chef Menteur Pass along the southwest shore, maximum observed flood and ebb currents were near 1.8 fps and 1.3 fps, respectively. The flood-ebb direction was along channel and showed relatively little variation.

54. In the Industrial Canal at sta V-6 (Plates 150-154), maximum observed flood and ebb currents were 2.4 fps and 2.0 fps respectively, with the flood-ebb direction approximately along canal. Occasional periods during low currents where the current meter digital compass indicated a constant direction when the current direction actually reverses can also be seen in the data.

55. In the Intracoastal Waterway at sta V5 (Plates 145-149), observed maximum flood and ebb currents were approximately 0.7 fps and 0.9 fps respectively. During one flood cycle maximum flood current was 1.2 fps which corresponded with a general rise in surface elevation near day 292. Direction of flood-ebb currents was primarily along the waterway with the flood direction to the west-southwest.

56. Sta V1 (Plates 125-129) was located southeast of Shell Beach along the southwest side of the MR-GO. Maximum observed flood and ebb currents were 2.0 fps and 2.5 fps, respectively. Neap tides occurred

near Julian days 275, 288, and 302. Maximum observed flood and ebb currents between Lake Borgne and the MR-GO at sta V2 (Plates 130-134) were approximately 1.7 fps and 2.0 fps respectively. At Bayou Bienvenue, sta V4 (Plates 140-144), maximum observed flood and ebb currents were approximately 1.9 fps and 1.2 fps, respectively. The flood and ebb direction was relatively along channel in each case. The flood direction at sta V2 was into Lake Borgne and into Bayou Bienvenue at sta V4. Current data for V3 (Plates 135-139) indicated flood currents were into Lake Borgne at Bayou Dupre. Scatter in the direction data at V3 is due to relocation of the meter on 16 October 1976. At Pass Manchac, between Lake Pontchartrain and Lake Maurepas, maximum observed flood-ebb currents from sta V21-S (Plates 200-204), were approximately 2.2 fps and 2.0 fps, respectively. Resolution of the direction by the current meter at V21-S was not as close as at other stations.

57. Observed maximum currents in the intensive data acquisition program ranged from less than 1.0 fps in the Intracoastal Waterway to slightly less than 3.0 fps in The Rigolets. The diurnal flood and ebb of the tide was evident at each station. In The Rigolets, slight changes in flood-ebb direction occurred, probably due to local bathymetry. In Lake Pontchartrain, current direction data from sta V17 and V18 were not usable due to sticking of the digital compass and lack of current magnitude data one to two weeks after each installation; however, the observed current magnitude in Lake Pontchartrain showed that maximum currents near middepth were less than 0.5 fps. Frequent short-term changes in magnitude also occurred in the data, indicating that the currents were not predominantly tidal.

58. Current data from the 25-hour survey are presented in Table 11 for each station in the six ranges. Temperature and salinity data also were observed and are presented in the table for each station. Sta V6, V8-B, and V11 from the intensive current survey in the IHNC, Chef Menteur, and The Rigolets were near range sta AB, CA, and E from the 25-hour survey. The phases of the current observations from the two current data series agree quite well and amplitudes are in good agreement in Chef Menteur and The Rigolets. In the IHNC, the relatively

constant current magnitude indicated at range sta AA and BB between approximately hours 1100 and 1700 on day 292 (19 October 1978) is not present in the intensive survey data. Current magnitude data from the IHNC observed at sta V6 in the intensive data acquisition indicated that variations in observations of current magnitude may exceed 0.7 fps within 0.1 hr and resulted in the variation between the two current data series in the IHNC. Both current data sets show increased ebb flow in the passes and the IHNC as the general lake level decreased from a peak near hour 0000 on day 292.

Harmonic analysis

59. Results of the filtered flood-ebb component analysis for the O1 current constituent amplitude are shown in Figure 14. Amplitude for the remaining current constituents included in the analysis are given in Table 12. The local epoch for each station is given in Table 13. Record lengths were insufficient to adequately define both constituents K1 and P1 and only K1 was included in the analysis. Consequently, K1 was not accurately defined due to the effect of P1 (i.e. some energy from P1 will be included in the K1 constituent when using a data record this short). It should be noted that a longer current record was impractical, due to the high rate of current meter loss (vandalism and accidental loss). During the measurement period, the following losses were experienced:

- a. First intensive survey--2 ENDECO 105's were lost and 17 were moved and anchors taken.
- b. Supplemental intensive survey--5 ENDECO 174's were lost out of a total of 16 meters even though each site was checked a minimum of several times each week.
- c. Water quality data acquisition program--17 ENDECO 174's were lost.

60. The maximum amplitude for the O1 constituent occurred in The Rigolets and Pass Manchac (1.10 fps and 0.87 fps, respectively) and was at a minimum in the Intracoastal Waterway (0.14 fps), similar to the current data. The amplitude of the O1 constituent at sta V10-S and V11-S (0.77 fps and 0.56 fps, respectively) at the Lake Pontchartrain end of The Rigolets also indicated a stronger flood-ebb current along

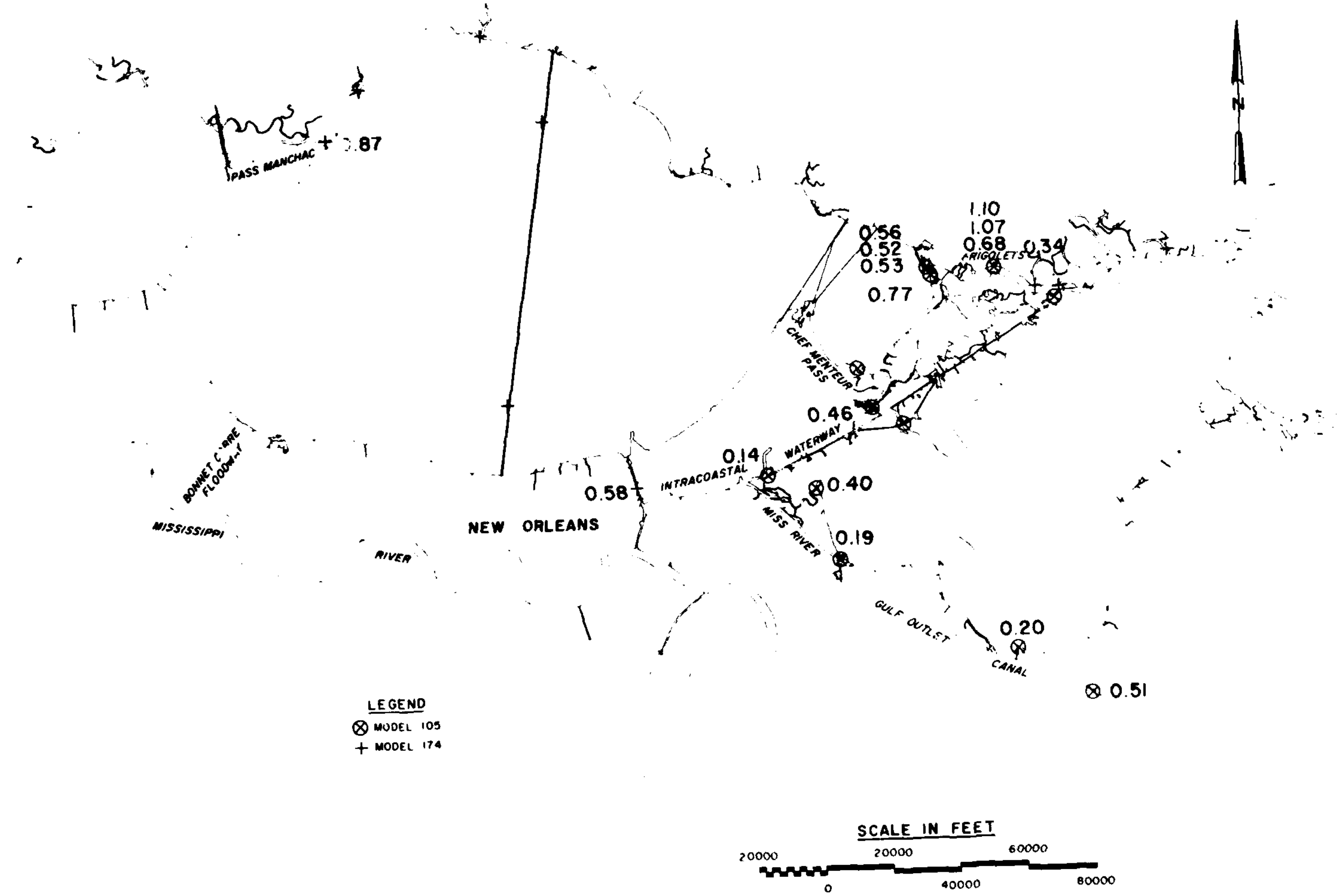

Figure 14. Current amplitude in feet per second of the O1 constituent

the south side of The Rigolets channel.

61. Plots of the current calculated from harmonic analysis results are shown in Plates 205-221 for the 16 analyzed current meter locations. The filtered observed data also are shown on the plots. In general, calculated and observed current data do not compare quite as well as the surface elevation data; however, the comparison is reasonably close. The rms value of the residual between observed and calculated data also and the mean (net) flood/ebb current at each station are shown in Table 12. A longer data record from which P1 could have been determined would have reduced the residual in the record.

62. In comparison with sta V12, the phase lag calculated from local epoch data for the O1 constituent to sta V10 and V11 was approximately 0.3 hr. In Chef Menteur at sta V8-S, the phase lag was approximately -0.1 hr. In the MR-GO and IHNC at sta V1 and V6, the phase lag was approximately 3.0 hr and 2.5 hr, respectively. In the Intracoastal Waterway at sta V5, the phase lag was approximately -5.5 hr. At sta V13 in the west mouth of the West Pearl River, the phase lag was approximately 9.8 hr, and at sta V21 in Pass Manchac, the phase lag was approximately 6.5 hr. The longer lag at sta V13 was due to ebb flow at V13 as flood flow developed at sta V12. The current data and phase lags indicate development of a complex current pattern in the interconnecting channels of the study area. The phase lag to Pass Manchac corresponds with the phase lag of the surface elevation for the O1 constituent from tide sta R-1 near V12 to tide sta P-9 near V21.

Conductivity and Temperature

63. Conductivity data recorded by ENDECO Model 174 current meters for sta V6, V13, V14, and V16 are shown in Plates 222-227. The diurnal variation in conductivity with the ebb-flood cycles of the tide is demonstrated by the data at Pearl River (V16), The Rigolets (V13 and V14), and the IHNC (V6). The conductivity is highest at V6 in the IHNC and ranged from a minimum of approximately 5.7 mmhos/cm near day 316 to a maximum of approximately 26 mmhos/cm near day 303. The broad rise in conductivity near day 289 coincided with a two-day period of flow into

Lake Pontchartrain without development of ebb currents. The conductivity data at V16 are similar to the V6 data with a maximum conductivity of 24.5 mmhos/cm again near day 303. The decrease in conductivity from day 285 to day 289 corresponded with a general decrease in surface elevation over the study area but is not as apparent at V6. A general rise in conductivity occurred at both stations after day 289 and water-surface elevation in the study area increased over the next several days.

64. The conductivity data for sta V13 and V14 were lower than that for V6 and the diurnal variation in conductivity still occurred but was not as evident as at V6 and V16.

65. Conductivity data less than 5 mmhos/cm (lower limit of the sensors) are indicated on the conductivity plots as a straight line at 5 mmhos/cm (see Plate 224). At sta V17 and V18 in Lake Pontchartrain, V19 and V20 along the north shore, and V21-S and V21-B in Pass Manchac, the conductivity was less than 5 mmhos/cm during the intensive observation period. A conductivity of 5 mmhos/cm or less represents total salts of approximately 2.6 ppt at 30°C and approximately 4.0 ppt at 10°C.

66. Temperature data for V13, V14, V16, V18, and V20 through V21-B are shown in Plates 228-239. At sta V13, V14, and V16 through V18, the observed temperature data were quite similar with relatively small variation from the general temperature trend with temperatures during the observation period ranging from approximately 16 to 26°C. Temperature trends were similar near the west end of Lake Pontchartrain at sta V21; but at V20, temperatures were generally slightly lower and had stronger fluctuations.

Wind Data

67. Hourly average wind speed and direction observed at 10 meters at weather sta WS-1 are presented in Plates 240 and 241 for day 285 through day 314 for the intensive data acquisition period. Maximum hourly average winds of 25 mph from the north-northwest occurred near

day 287 with a corresponding decrease in surface elevation in Lakes Pontchartrain and Borgne. Winds then rotated clockwise from the north back to the north through northeast near day 290 with a maximum hourly average speed of approximately 23.5 mph and corresponded with a decrease in lake surface elevation over the study area. The lake level rose rapidly after winds shifted near day 290 with a maximum hourly average speed of 15 mph from the east-northeast to east. Hourly average winds in excess of 20 mph also occurred near days 304 and 312 approximately from the east and west-northwest, respectively.

68. Wind data for the durations listed in Table 5 also are on file at WES.

Water Quality Observations

69. Temperature data for sta MM1 and MM9 are shown in Plates 242-256 from mid-November 1978 to June 1979. The plots show the gradual temperature drop to approximately 8°C in January and February 1979 and the gradual rise through the spring to a temperature near 30°C. Conductivity during the water quality observation period was at or less than 5 mmhos/cm in Lake Pontchartrain at the east end of the lake, for stations out in the lake, and along the northwest side of the shore. Conductivity data for sta MM1 and MM2 (at the eastern end of Lake Pontchartrain) are shown in Plates 257 and 258 for days 320 through 346. The conductivity drops to or below 5 mmhos/cm during this period and is normally at or below 5 mmhos/cm during the remainder of the observation period until early July 1979. The rise in conductivity at sta MM1 beginning at day 344 was probably due to fouling of the conductivity probe and probably does not represent an increase in conductivity in the lake. Conductivity data for MM3 in the IHNC are shown in Plates 259-263 for day 320 in 1978 through 15 in 1979, day 17 through '9, and day 144 through 156. Probable fouling of the conductivity probe again occurred between days 10 and 15. The data for MM3 indicate a similar decrease in conductivity through the winter and spring of 1979 as that which occurred at MM1 and MM2. Salinity sample data from mid-April 1979

through August 1979 are discussed in Appendix B with the Bonnet Carre observation data.

Numerical Model Verification Data

70. Two spring and one neap tide periods have been selected for use during numerical tidal circulation model verification. The spring tides are days 290 through 294 (17-21 October) and days 307 through 311 (3-7 November) in 1978 during the intensive current survey. The neap tide was selected from the supplemental current survey and included day 236 through 240 (24-28 August) in 1979. Data to be used for model verification are presented in Appendix E. Filtered prototype surface elevation and current observations, tidal elevations and velocities for the O1 constituent, and those calculated from the harmonic analysis results are presented.

PART V: CONCLUSIONS

71. Conclusions from analysis of prototype surface elevation and current data from the intensive data acquisition program are:

a. O1 and K1 are the principal diurnal tidal constituents in the study area.

b. P1 and Q1 are less significant and have amplitudes of 0.05 ft or less in Lake Pontchartrain.

c. Amplitude of semidiurnal constituents S2 and M2 range between 0.05 ft and 0.10 ft in Lake Borgne and decrease to 0.01 ft or less in Lake Pontchartrain.

d. Other semidiurnal constituents and overtides included in the analysis are smaller in amplitude than S2 and M2.

e. In The Rigolets, Chef Menteur Pass, Intracoastal Waterway, MR-GO, IHNC, and Pass Manchac, maximum observed currents during the intensive data acquisition program ranged from slightly less than 1.0 fps to slightly less than 3.0 fps.

f. Observed maximum currents in Lake Pontchartrain at two stations along the causeway were relatively low with peaks near 0.3 fps to 0.5 fps and with frequent short-term changes in magnitude.

g. The O1 current constituent was largest in The Rigolets and Pass Manchac with an amplitude at V12-S and V21-S of 1.10 fps and 0.87 fps, respectively.

h. Conductivity data reflected effects of the reversal of flow direction during the tidal cycle in The Rigolets, IHNC, and Pearl River.

i. Conductivity was at or below 5 mmhos/cm at stations in Lake Pontchartrain, along the north shore of the lake, and in Pass Manchac during the entire observation period.

j. Temperature fluctuations ranging from approximately 19 to 25°C were relatively uniform and reflected little variation over the study area from Pearl River to Pass Manchac.

72. Results from the analysis of prototype surface elevations and currents provide a sufficient data base for verification of a numerical tidal circulation model of the study area. Sufficient information is provided to define tidal input boundary conditions and to define constituent tidal elevations and currents at selected stations within the modeled area to assure that a satisfactory model verification is achieved.

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Table 1

Tide Gage Locations

Station	Offset, ft*	Gage Mount
B-1	**	Light 22 in Mississippi Sound
B-2	0.78	Light 8 in Pearl River
B-3	**	Northwest of Malheureaux Point in Lake Borgne
B-4	1.02	Light A in Chef Menteur
B-5	1.16	Pier at Martello Castle
B-6	1.43	Concrete pier south of Bayou Yscloskey channel
B-7	**	Light 93 on Mississippi River-Gulf Outlet Channel
R-1	1.28	Light 3 in The Rigolets
P-1	1.18	Light 6 north of Chef Menteur
P-2	1.33	Light west of Lacombe Bayou channel
P-3	**	Lake Pontchartrain Causeway mile 20
P-4	0.30	Lake Pontchartrain Causeway mile 12
P-5	1.05	Lake Pontchartrain Causeway mile 4
P-6	1.28	Ideal Cement Company Dock
P-7	2.03	Private pier at mouth of Tchefuncta River north of Light 8
P-8	**	Light 8 at Tangipahoa River channel
P-9	0.67	Lighthouse pier at Pass Manchac
M-1	1.24	North fender of railroad bascule bridge

* Add offset to plotted elevation data to adjust the data to the Simmesport Free Plane datum.

** Simmesport Free Plane datum not available.

Table 2

Intensive Data Acquisition Program:

Current Meter Depth of Measurement and Models

Station*	Meter Model	Meter Height Above Bottom, ft	Local Depth, ft
V1	105	14	28
V2	105	6	12
V3	105	5	10
V4	105	6	12
V5	105	7	15
V6	174	10	22
V7-S	105	25	32
V7-M	105	15	32
V7-B	105	5	32
V8-S	105	44	50
V8-B	105	11	50
V9-S	105	35	40
V9-M	105	20	40
V9-B	105	5	40
V10-S	105	35	40
V10-M	105	20	40
V10-B	105	5	40
V11-S	105	20	27
V11-M	105	12	27
V11-B	105	5	27
V12-S	105	43	50
V12-M	105	25	50
V12-B	105	5	50
V13	174	7	13
V14	174	6	12

(Continued)

* S, M, and B denote surface, middepth, and bottom gage locations.

Table 2 (Concluded)

Station	Meter Model	Meter Height Above Bottom, ft	Local Depth, ft
V15-S	105	43	50
V15-M	105	25	50
V15-B	105	5	50
V16	174	13	27
V17	174	7.5	16
V18	174	7	16
V19	174	5	9.5
V20	174	8	20
V21-S	174	30	37
V21-B	174	7	37

Table 3

25-Hour Survey Velocity Range Information

Range	Station	Location	Local Depth ft
A	AA	West side, IHNC	30
	AB	East side, IHNC	30
B	BA	West side, Chef Menteur Pass	30
	BC	East side, Chef Menteur Pass	30
C	CA	West side, Chef Menteur Pass south of Intracoastal Waterway	23
	CB	East side, Chef Menteur Pass south of Intracoastal Waterway	42
	CD	West side, Chef Menteur Pass north of Intracoastal Waterway	20
	CE	East side, Chef Menteur Pass north of Intracoastal Waterway	13
D	DA	West side, Chef Menteur Pass north of Intracoastal Waterway auxiliary channel	35
	DB	East side, Chef Menteur Pass north of Intracoastal Waterway auxiliary channel	35
	DC	East side, Chef Menteur Pass south of Intracoastal Waterway auxiliary channel	42
	DE	West side, Chef Menteur Pass south of Intracoastal Waterway auxiliary channel	37
E	EA	South side, The Rigolets	45
	EB	North side, The Rigolets	25
F	FA	West side, The Rigolets	36
	FB	East side, The Rigolets	38

Table 4

Intensive Data Acquisition Program:

Operational Status of Current Meters

Station*	Model	Data Record, 1978	Data Status
V1	105	9-21/11-7	Complete data record
V2	105	9-21/11-7	Complete data record
V3	105	10-16/11-7	Meter displaced/reset 16 Oct 78
V4	105	9-21/10-21	Meter displaced
V5	105	9-21/11-6	Meter displaced
V6	174	10-4/11-13	Meter displaced
V7-S	105	--	Meter displaced and found in shallow water
V7-M	105	--	Meter displaced and found in shallow water
V7-B	105	--	Meter displaced and found in shallow water
V8-S	105	9-23/11-6	Complete data record
V8-B	105	9-23/10-5	15-day record gap with sticking of velocity data
V9-S	105	--	Meter displaced and found floating on surface
V9-M	105	9-23/9-27	Meter displaced and found floating on surface
V9-B	105	9-23/9-27	Meter displaced and found floating on surface
V10-S	105	9-25/10-24	Displaced and recovered
V10-M	105	--	Lost
V10-B	105	--	Lost
V11-S	105	9-25/11-6	Complete data record
V11-M	105	9-25/11-6	Complete data record
V11-B	105	9-25/11-6	Complete data record
V12-S	105	10-2/11-6	Complete data record

(Continued)

* S, M, and B denote surface, middepth, and bottom gage locations.

Table 4 (Concluded)

Station*	Model	Data Record, 1978	Data Status
V12-M	105	10-2/11-6	Complete data record
V12-B	105	10-2/11-6	Complete data record
V13	174	10-2/11-6	Complete data record
V14	174	--	Velocity data not recorded
V15-S	105	10-2/10-8	Meter lost/recovered
V15-M	105	--	Meter lost
V15-B	105	10-2/10-8	Meter lost/recovered
V16	174	--	Velocity data not properly recorded
V17	174	--	Direction/velocity sticking
V18	174	--	Direction/velocity sticking
V19	174		Direction/velocity sticking
V20	174	10-15/10-26	Direction/velocity sticking
V21-S	174	10-5/10-25	Direction/velocity sticking
V21-B	174	--	Direction/velocity sticking

Table 5

Weather Station Observation Intervals

Station	Anemometer Height m	Time From	Time To
WS-1	5	10/27/78	11/13/78
		11/14/78	12/17/78
		12/19/78	3/2/78
		4/19/79	5/5/79
	10	10/12/78	11/13/78
		11/14/78	12/15/78
		12/19/78	12/23/78
		1/17/79	1/28/79
		2/12/79	3/16/79
		3/20/79	4/19/79
		6/19/79	6/27/79
		7/17/79	7/28/79
WS-2	10	10/19/78	2/23/79
		4/17/79	5/31/79
		6/6/79	8/22/79
		9/10/79	11/5/79

Table 6

Supplemental Current Stations

Station	Meter Model	Location	Meter Height Above Bottom ft	Local Depth ft
C5	105	Intracoastal Waterway	6	12
C6	174	Inner Harbor Navigation Canal	12.5	25
C7	174	Chef Menteur	9.5	19
C8	105	Chef Menteur	32	64
C9	174	Chef Menteur	19	38
C10	174	The Rigolets	28.5	57
C11-M	174	The Rigolets	8.5	17
C11-B	(not installed)	--	--	--
C12-M	174	The Rigolets	--	--
C12-B	174	The Rigolets	6	46
C13	105	West Mouth, West Pearl River	6.5	13
C14	105	North Pass, Pearl River	6	9
C15	105	The Rigolets	6.5	13
C16	105	Pearl River	6.5	11
C21	105	Pass Manchac	13.5	37
C22	174	Mississippi River-Gulf Outlet Canal	13	26

Table 7

Harmonic Analysis of Tidal Elevations:

Record Length and Period of Observation

Tide Gage	Start Date	End Date	Record Length days
B-1	1/20/78	1/20/79	156
B-2	8/18/78	2/16/79	182
B-3	10/8/78	4/8/79	182
B-4	8/18/78	2/16/79	182
B-5	10/21/78	4/21/79	182
B-6	8/18/78	1/20/79	156
R-1	8/18/78	2/16/79	182
P-1	12/14/78	6/14/79	182
P-2	8/14/78	12/10/78	118
P-3	4/28/79	10/7/79	182
P-4	8/18/78	2/16/79	182
P-5	8/18/78	2/16/79	182
P-6	8/18/78	1/25/79	160
P-7	8/18/78	2/16/79	182
P-8	8/17/78	10/8/78	53
P-9	12/16/78	3/11/79	85
M-1	10/8/78	4/8/79	182

Table 8

Constituent Amplitude of Tidal Elevations

Tide Gage	Record Length days	Constituent Amplitude, ft												Residual rms, ft
		O1	K1	P1	Q1	M1	J1	M2	S2	N2	M4	M6	M8	
B-1	91	0.39	0.51	0.16	0.09	0.03	0.02	0.09	0.05	0.02	0.02	--	--	0.14
B-2	182	0.35	0.39	0.17	0.07	0.02	0.02	0.08	0.05	0.02	--	--	--	0.14
B-3	182	0.32	0.39	0.12	0.07	0.02	--	0.06	0.04	0.02	--	--	--	0.12
B-4	182	0.28	0.34	0.10	0.06	0.02	--	0.07	0.04	0.02	--	--	--	0.14
B-5	182	0.30	0.38	0.14	0.08	--	--	0.08	0.06	0.02	--	--	--	0.17
B-6	156	0.32	0.41	0.14	0.08	0.02	0.01	0.09	0.05	0.02	--	--	--	0.15
R-1	182	0.21	0.24	0.09	0.04	0.02	0.02	0.05	0.03	0.01	--	--	--	0.10
P-1	182	0.11	0.14	0.05	0.03	0.01	--	0.02	0.01	--	--	--	--	0.10
P-2	118	0.10	0.12	0.04	0.01	0.01	--	0.01	--	--	--	--	--	0.06
P-3	182	0.10	0.13	0.05	0.02	0.01	0.01	0.02	0.01	--	--	--	--	0.07
P-4	182	0.10	0.10	0.03	0.02	--	--	--	--	--	--	--	--	0.05
P-5	182	0.10	0.11	0.03	0.02	0.01	--	--	0.01	--	--	--	--	0.06
P-6	160	0.17	0.21	0.07	0.03	--	--	0.05	0.02	0.01	--	--	--	0.07
P-7	182	0.09	0.11	0.02	0.02	--	--	--	--	--	--	--	--	0.08
P-8	53	0.12	0.13	0.04	0.02	0.02	0.01	0.01	0.01	--	--	--	--	--
P-9	85	0.07	0.10	0.03	0.03	0.02	0.01	0.01	--	--	--	--	--	0.08
M-1	182	0.05	0.06	0.03	0.02	--	--	--	--	--	--	--	--	0.04

Table 9

Average Constituent Amplitude of Tidal Elevations

Corrected for Node Factor

Tide Gage	O1	K1	P1	Q1	M1	J1	M2	S2	N2
B-1	0.48	0.58	0.16	0.10	0.03	0.02	0.09	0.07	0.02
B-2	0.43	0.44	0.17	0.09	0.02	0.02	0.07	0.05	0.02
B-3	0.39	0.44	0.12	0.09	0.02	--	0.06	0.04	0.02
B-4	0.35	0.38	0.10	0.07	0.02	--	0.07	0.04	0.02
B-5	0.38	0.43	0.14	0.10	--	--	0.07	0.06	0.02
B-6	0.40	0.46	0.14	0.09	0.02	0.02	0.09	0.05	0.02
B-7	--	--	--	--	--	--	--	--	--
R-1	0.27	0.27	0.09	0.05	0.02	0.02	0.05	0.03	0.01
P-1	0.14	0.16	0.05	0.03	0.01	--	0.02	0.01	--
P-2	0.13	0.14	0.04	0.02	0.01	--	0.01	--	--
P-3	0.13	0.15	0.05	0.03	0.01	0.01	0.02	--	--
P-4	0.12	0.12	0.03	0.03	--	--	--	--	--
P-5	0.12	0.12	0.03	0.03	0.01	--	--	0.01	--
P-6	0.21	0.23	0.07	0.04	--	--	0.04	0.02	0.01
P-7	0.11	0.12	0.02	0.03	--	--	--	--	--
P-8	--	--	--	--	--	--	--	--	--
P-9	0.09	0.11	0.03	0.04	0.02	0.02	0.01	--	--
M-1	0.07	0.07	0.03	0.02	--	--	--	--	--

Table 10

Local Epoch for Tidal Elevations

Tide Gage	Local Epoch, deg								
	O1	K1	P1	Q1	M1	J1	M2	S2	N2
B-1	333.8	346.5	359.3	324.4	15.1	232.2	57.6	65.7	79.1
B-2	342.6	6.0	358.9	338.7	172.2	338.7	93.0	84.2	116.5
B-3	345.1	4.7	14.5	338.5	119.6	284.3	91.2	87.9	123.2
B-4	358.9	29.4	29.0	357.9	118.9	277.9	131.3	141.2	174.1
B-5	11.8	34.2	55.9	6.7	66.7	245.3	138.9	158.9	167.2
B-6	355.6	22.5	27.8	342.6	141.0	64.4	127.9	120.6	165.2
R-1	48.4	18.2	4.2	344.2	162.7	23.1	126.3	86.7	135.5
P-1	32.3	49.3	35.6	12.6	114.3	119.7	148.5	124.9	207.3
P-2	76.6	109.4	71.9	39.2	269.8	72.3	223.6	28[illegible]	198.6
P-3	63.0	91.3	61.3	23.8	90.7	13.6	202.9	231.5	203.7
P-4	85.9	115.9	117.1	81.3	289.2	53.7	240.0	239.2	254.0
P-5	90.9	112.7	93.5	82.2	278.3	189.7	262.7	265.1	290.4
P-6	25.8	49.4	43.5	13.1	134.9	54.1	145.8	160.2	170.4
P-7	86.8	124.5	152.0	80.6	275.3	309.3	248.4	230.6	233.2
P-8	37.5	36.8	356.2	21.7	111.6	357.2	103.1	100.3	150.1
P-9	91.2	118.2	169.7	94.1	332.5	19.1	255.4	256.0	341.6
M-1	137.0	166.8	214.4	143.2	32.5	53.9	301.1	327.8	1.4

Table 11

Lake Pontchartrain 25-Hour Velocity Range Data

Time						
Date	Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station AA			
			Surface			
10/19/78	9.08	3.0	0.8	318	70.0	12.6
10/19/78	9.72	3.0	0.8	330		
10/19/78	10.10	3.0	1.3	328	71.0	11.2
10/19/78	10.72	3.0	1.8	332		
10/19/78	11.05	3.0	1.9	330	70.0	8.2
10/19/78	11.63	3.0	1.8	336		
10/19/78	12.08	3.0	1.8	332	70.0	7.2
10/19/78	12.65	3.0	1.7	332		
10/19/78	13.07	3.0	0.6	330	70.0	6.8
10/19/78	13.62	3.0	0.6	333		
10/19/78	14.07	3.0	0.6	336	70.0	6.5
10/19/78	14.63	3.0	0.6	334		
10/19/78	15.07	3.0	0.6	337	68.0	6.1
10/19/78	15.62	3.0	0.6	336		
10/19/78	16.05	3.0	0.6	330	70.0	5.9
10/19/78	16.62	3.0	0.6	334		
10/19/78	17.03	3.0	0.6	330	70.0	5.8
10/19/78	17.62	3.0	0.6	330		
10/19/78	18.08	3.0	0.4	330	--	5.7
10/19/78	18.68	3.0	0.5	334		
10/19/78	19.08	3.0	0.4	332	--	5.6
10/19/78	19.65	3.0	0.3	330		
10/19/78	20.07	3.0	0.4	330	--	5.5
10/19/78	20.63	3.0	1.0	330		
10/19/78	21.07	3.0	0.8	329	--	5.5
10/19/78	21.60	3.0	0.6	330		
10/19/78	22.10	3.0	0.2	312	--	5.5
10/19/78	22.70	3.0	0.0	75		
10/19/78	23.08	3.0	0.0	359	--	5.5
10/19/78	23.63	3.0	0.0	72		
10/20/78	0.10	3.0	0.2	172	--	5.6
10/20/78	0.68	3.0	0.4	134		
10/20/78	2.12	3.0	1.0	132	--	8.6
10/20/78	2.67	3.0	1.2	125		
10/20/78	3.07	3.0	1.2	132	--	9.1
10/20/78	4.25	3.0	1.2	124	--	10.3
10/20/78	5.07	3.0	1.7	124	--	10.3
10/20/78	6.33	3.0	0.9	120	--	10.5
10/20/78	7.13	3.0	0.5	114	--	10.1
10/20/78	8.23	3.0	0.2	120	--	9.9
10/20/78	9.03	3.0	0.1	270	--	11.3
			Middepth			
10/19/78	9.05	17.0	0.6	314	70.0	12.5
10/19/78	9.70	16.0	0.8	340		
10/19/78	10.07	15.2	0.5	330	71.0	12.8
10/19/78	10.70	14.5	0.6	324		
10/19/78	11.03	15.9	0.7	326	70.0	10.6
10/19/78	11.62	13.2	0.8	330		
10/19/78	12.07	11.2	1.0	326	70.0	7.6
10/19/78	12.62	15.8	0.9	323		
10/19/78	13.05	15.0	0.3	322	70.0	7.1
10/19/78	13.60	13.8	0.4	328		
10/19/78	14.03	15.0	0.4	324	70.0	6.6
10/19/78	14.62	14.6	0.4	328		
10/19/78	15.03	16.5	0.4	320	68.0	6.1
10/19/78	15.60	13.5	0.4	335		
10/19/78	16.03	15.0	0.5	328	68.0	5.9
10/19/78	16.60	16.1	0.4	334		
10/19/78	17.02	16.0	0.4	332	70.0	5.8
10/19/78	17.60	13.2	0.6	332		
10/19/78	18.05	15.6	0.4	330	--	5.7
10/19/78	18.65	14.5	0.4	329		
10/19/78	[illegible]	15.8	0.4	330	--	5.6
10/19/78	[illegible]	14.1	0.4	330		
10/19/78	20.05	15.8	0.3	324	--	5.6
10/19/78	20.62	14.4	0.7	326		
10/19/78	21.05	15.6	0.8	320	--	5.5
10/19/78	21.58	16.5	0.2	310		
10/19/78	22.08	17.8	0.1	312	--	5.5
10/19/78	22.68	17.0	0.0	[illegible]		
10/19/78	23.03	17.2	0.0	54	--	5.9
10/19/78	23.62	14.0	0.2	100		
10/20/78	0.07	16.3	0.4	135	--	5.9
10/20/78	0.67	14.4	0.5	114		
10/20/78	2.10	13.0	1.0	130	--	8.8
10/20/78	[illegible]	11.9	0.6	128		
10/20/78	3.03	11.6	0.9	120	--	9.4
10/20/78	4.22	10.6	1.4	134	--	10.3
10/20/78	5.03	10.7	0.8	154	--	10.4
10/20/78	6.30	9.8	0.6	160	--	10.7
10/20/78	7.10	12.5	0.4	120	--	10.9
10/20/78	8.20	9.6	0.0	16	--	12.4
10/20/78	9.02	16.3	0.1	138	--	15.1
			Bottom			
10/19/78	9.00	34.0	0.2	326	70.0	12.9
10/19/78	9.67	32.0	0.6	330		
10/19/78	10.03	30.4	0.3	326	71.0	12.9
10/19/78	10.67	29.0	0.3	328		
10/19/78	11.00	31.8	0.4	310	70.0	12.7
10/19/78	11.60	26.4	0.3	334		

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station AA (Continued)			
			Bottom (Continued)			
10/19/78	12.03	22.4	0.5	320	70.0	9.4
10/19/78	12.60	31.5	0.4	328		
10/19/78	13.02	30.0	0.1	322	70.0	10.2
10/19/78	13.58	27.5	0.1	327		
10/19/78	14.00	30.0	0.2	328	70.0	8.9
10/19/78	14.60	29.2	0.2	332		
10/19/78	15.00	33.0	0.2	314	68.0	7.9
10/19/78	15.58	27.0	0.3	325		
10/19/78	16.00	30.0	0.2	332	70.0	6.2
10/19/78	16.58	32.2	0.2	330		
10/19/78	17.00	32.0	0.2	324	70.0	5.9
10/19/78	17.58	26.3	0.4	330		
10/19/78	18.02	31.2	0.3	323	68.0	5.7
10/19/78	18.63	29.0	0.3	324		
10/19/78	19.03	31.5	0.3	326	--	5.6
10/19/78	19.62	28.2	0.2	320		
10/19/78	20.00	31.5	0.2	314	68.0	5.6
10/19/78	20.60	28.7	0.8	330		
10/19/78	21.02	31.3	0.4	308	--	5.5
10/19/78	21.57	32.9	0.2	290		
10/19/78	22.05	35.5	0.1	315	--	5.5
10/19/78	22.65	33.9	0.0	90		
10/19/78	23.00	35.5	0.2	138	--	5.8
10/19/78	23.60	28.1	0.4	100		
10/20/78	0.03	32.5	0.1	162	--	5.7
10/20/78	0.65	28.7	0.4	130		
10/20/78	2.03	26.0	0.3	112	--	7.4
10/20/78	2.63	23.8	0.1	110		
10/20/78	3.00	23.3	0.2	160	--	11.2
10/20/78	4.17	21.2	0.0	268	--	11.6
10/20/78	5.00	21.4	0.2	226	--	11.1
10/20/78	6.27	19.5	0.3	210	--	11.7
10/20/78	7.07	25.0	0.6	150	--	13.3
10/20/78	8.17	19.1	0.0	58	--	12.6
10/20/78	9.00	32.5	0.4	90	--	15.2
			Station AB			
			Surface			
10/19/78	8.92	3.0	0.3	340	70.0	12.3
10/19/78	9.22	3.0	0.5	326	70.0	12.4
10/19/78	9.60	3.0	0.5	336		
10/19/78	10.23	3.0	1.5	334	71.0	10.8
10/19/78	10.58	3.0	1.9	334		
10/19/78	11.17	3.0	1.9	330	70.0	8.1
10/19/78	11.55	3.0	0.6	332		
10/19/78	12.22	3.0	1.7	332	70.0	7.2
10/19/78	12.55	3.0	1.6	332		
10/19/78	13.20	3.0	0.4	332	70.0	7.0
10/19/78	13.53	3.0	0.6	329		
10/19/78	14.17	3.0	0.4	336	70.0	6.5
10/19/78	14.57	3.0	0.5	328		
10/19/78	15.22	3.0	0.4	332	70.0	6.1
10/19/78	15.53	3.0	0.2	335		
10/19/78	16.20	3.0	0.4	335	70.0	5.9
10/19/78	16.53	3.0	0.4	338		
10/19/78	17.15	3.0	0.4	336	69.0	5.9
10/19/78	[illegible]	3.0	0.3	330		
10/19/78	18.22	3.0	0.3	331	--	5.7
10/19/78	18.58	3.0	0.4	328		
10/19/78	19.18	3.0	0.3	332	--	5.7
10/19/78	19.57	3.0	0.3	330		
10/19/78	20.18	3.0	0.6	328	--	5.6
10/19/78	20.55	3.0	0.7	328		
10/19/78	21.23	3.0	0.5	328	--	5.6
10/19/78	21.53	3.0	0.4	326		
10/19/78	22.25	3.0	0.0	250	--	5.5
10/19/78	22.57	3.0	0.2	330		
10/19/78	23.20	3.0	0.0	80	--	5.5
10/19/78	23.52	3.0	0.0	242		
10/20/78	0.27	3.0	0.1	89	--	6.1
10/20/78	0.58	3.0	0.4	244		
10/20/78	2.28	3.0	0.1	105	--	8.7
10/20/78	2.60	3.0	0.0	140		
10/20/78	3.22	3.0	0.3	145	--	10.4
10/20/78	4.10	3.0	0.6	64	--	9.5
10/20/78	5.20	3.0	0.2	84	--	9.8
10/20/78	6.15	3.0	0.2	130	--	10.3
10/20/78	7.23	3.0	0.2	140	--	10.3
10/20/78	8.12	3.0	0.6	129	--	9.7
10/20/78	9.18	3.0	0.6	120		
			Middepth			
10/19/78	8.88	12.0	0.4	0	70.0	12.6
10/19/78	9.20	10.5	0.5	316	70.0	12.4
10/19/78	9.58	13.5	0.6	338		
10/19/78	10.20	10.0	0.8	332	71.0	12.4
10/19/78	10.55	10.7	0.8	342		
10/19/78	11.15	10.4	1.0	344	70.0	9.1
10/19/78	11.53	12.5	0.3	340		
10/19/78	12.18	10.5	1.0	342	70.0	7.8
10/19/78	12.53	9.5	1.0	338		

(Continued)

Table 11 (Continued)

Time						
Date	Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station AB (Continued)			
			Middepth (Continued)			
10/19/78	13.17	10.5	0.4	338	70.0	7.2
10/19/78	13.52	10.8	0.2	335		
10/19/78	14.15	7.0	0.3	342	70.0	6.5
10/19/78	14.55	10.5	0.4	344		
10/19/78	15.17	9.4	0.3	330	70.0	6.1
10/19/78	15.52	10.8	0.4	346		
10/19/78	16.15	8.5	0.3	336	70.0	5.9
10/19/78	16.52	6.8	0.3	332		
10/19/78	17.13	11.3	0.4	335	69.0	5.8
10/19/78	17.52	9.1	0.3	335		
10/19/78	18.17	10.1	0.4	330	--	5.7
10/19/78	18.55	9.5	0.4	336		
10/19/78	19.17	10.3	0.2	334	--	5.6
10/19/78	19.55	10.4	0.2	332		
10/19/78	20.15	9.5	0.5	330	--	5.5
10/19/78	20.53	9.7	0.6	330		
10/19/78	21.22	9.5	0.4	330	--	5.6
10/19/78	21.52	9.2	0.2	330		
10/19/78	22.22	6.9	0.1	321	--	5.6
10/19/78	22.55	8.0	0.2	325		
10/19/78	23.17	19.7	0.1	104	--	5.5
10/20/78	0.22	17.7	0.6	132	--	6.4
10/20/78	0.57	8.4	0.3	210		
10/20/78	2.25	14.0	0.2	114	--	12.6
10/20/78	2.57	9.8	0.0	154		
10/20/78	3.17	11.2	0.0	60	--	12.0
10/20/78	4.07	13.2	0.1	333	--	10.6
10/20/78	5.17	6.2	0.2	32	--	10.0
10/20/78	6.10	11.5	0.2	160	--	10.8
10/20/78	7.22	10.3	0.2	130	--	11.7
10/20/78	8.08	17.9	0.1	2	--	15.1
10/20/78	9.15	15.5	0.4	4	--	14.8
			Bottom			
10/19/78	8.85	24.0	0.2	34	70.0	12.7
10/19/78	9.17	21.0	0.4	320	70.0	12.5
10/19/78	9.55	27.0	0.1	334		
10/19/78	10.17	20.0	0.6	330	71.0	12.7
10/19/78	10.52	21.4	0.4	336		
10/19/78	11.12	20.8	0.5	334	70.0	10.6
10/19/78	11.52	25.0	0.2	334		
10/19/78	12.17	21.1	0.4	329	70.0	8.3
10/19/78	12.52	19.0	0.6	340		
10/19/78	13.13	21.0	0.2	332	70.0	7.3
10/19/78	13.50	21.5	0.1	344		
10/19/78	14.13	14.0	0.2	348	69.0	6.5
10/19/78	14.53	21.0	0.2	340		
10/19/78	15.13	18.8	0.2	338	70.0	6.2
10/19/78	15.50	21.5	0.2	338		
10/19/78	16.12	18.0	0.2	342	70.0	6.0
10/19/78	16.50	13.5	0.2	340		
10/19/78	17.10	22.5	0.2	340	70.0	5.8
10/19/78	17.50	18.2	0.1	336		
10/19/78	18.13	20.3	0.2	333	68.0	5.7
10/19/78	18.52	19.0	0.2	332		
10/19/78	19.15	20.5	0.2	330	--	5.6
10/19/78	19.53	20.8	0.2	335		
10/19/78	20.12	19.0	0.2	330	68.0	5.6
10/19/78	20.52	19.3	0.3	320		
10/19/78	21.18	19.0	0.2	340	--	5.6
10/19/78	21.50	18.3	0.1	340		
10/19/78	22.18	13.8	0.0	337	--	5.5
10/19/78	22.53	16.0	0.1	330		
10/19/78	23.13	39.4	0.2	148	--	11.6
10/19/78	23.50	9.0	0.0	242		
10/20/78	0.18	35.4	0.0	54	--	12.5
10/20/78	0.55	16.7	0.2	280		
10/20/78	2.22	27.0	0.2	138	--	9.4
10/20/78	2.53	19.5	0.0	262		
10/20/78	3.13	22.5	0.2	60	--	12.1
10/20/78	4.00	26.4	0.2	12	--	11.8
10/20/78	5.15	12.5	0.2	44	--	10.3
10/20/78	6.07	23.0	0.1	144	--	12.5
10/20/78	7.20	20.5	0.1	140	--	11.6
10/20/78	8.05	33.8	0.0	132	--	15.2
10/20/78	9.12	31.0	0.7	152	--	12.0
			Station BA			
			Surface			
10/19/78	9.62	3.0	1.4	246	66.0	7.3
10/19/78	10.03	3.0	1.4	249	65.0	7.2
10/19/78	10.55	3.0	1.8	246	66.0	7.3
10/19/78	11.07	3.0	2.0	264	68.0	7.5
10/19/78	11.55	3.0	2.2	268	68.0	7.4
10/19/78	12.03	3.0	2.3	261	68.0	7.5
10/19/78	12.55	3.0	2.5	261	67.0	7.7
10/19/78	13.12	3.0	2.5	263	68.0	7.4
10/19/78	13.55	3.0	2.5	267	68.0	7.4
10/19/78	14.03	3.0	2.6	260	68.0	7.5
10/19/78	14.53	3.0	2.8	258		

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station BA (Continued)			
			Surface			
10/19/78	15.03	3.0	2.7	260	68.0	7.2
10/19/78	15.53	3.0	3.1	260		
10/19/78	16.07	3.0	3.1	258	68.0	7.5
10/19/78	16.53	3.0	3.0	252		
10/19/78	17.03	3.0	2.8	247	67.0	7.4
10/19/78	17.55	3.0	3.1	252		
10/19/78	18.07	3.0	3.2	248	66.0	7.4
10/19/78	18.55	3.0	3.1	260		
10/19/78	19.03	3.0	3.0	248	--	7.3
10/19/78	19.55	3.0	2.7	246		
10/19/78	20.07	3.0	2.3	244	62.0	7.2
10/19/78	20.57	3.0	2.4	244		
10/19/78	21.05	3.0	2.1	246	62.0	7.2
10/19/78	21.53	3.0	2.0	248		
10/19/78	22.05	3.0	1.8	248	62.0	7.0
10/19/78	22.53	3.0	1.8	256		
10/19/78	23.03	3.0	1.2	266	62.0	6.9
10/19/78	23.53	3.0	1.0	248		
10/20/78	0.05	3.0	0.8	272	62.0	6.9
10/20/78	0.53	3.0	0.6	292		
10/20/78	1.03	3.0	0.8	28		
10/20/78	1.53	3.0	1.0	52		
10/20/78	2.07	3.0	1.6	72	62.0	7.0
10/20/78	2.53	3.0	1.7	86		
10/20/78	3.03	3.0	2.0	90	62.0	7.0
10/20/78	3.53	3.0	2.0	90		
10/20/78	4.03	3.0	2.0	80	64.0	7.2
10/20/78	4.58	3.0	2.0	90		
10/20/78	5.03	3.0	1.8	78	64.0	7.2
10/20/78	5.53	3.0	1.6	90		
10/20/78	7.55	3.0	0.7	92	64.0	7.3
10/20/78	8.03	3.0	0.7	210	62.0	7.4
10/20/78	8.53	3.0	0.6	262		
10/20/78	9.03	3.0	0.3	230		
			Middepth			
10/19/78	9.57	15.0	1.0	230	66.0	7.4
10/19/78	10.02	15.0	1.4	240	65.0	7.4
10/19/78	10.53	15.0	1.2	240	66.0	7.3
10/19/78	11.03	15.0	1.8	252	68.0	7.6
10/19/78	11.53	15.0	2.2	257	72.0	7.6
10/19/78	12.02	15.0	2.4	252	69.0	7.7
10/19/78	12.53	15.0	2.4	246	69.0	7.6
10/19/78	13.03	15.0	2.5	256	68.0	7.6
10/19/78	13.53	15.0	2.5	252	68.0	7.6
10/19/78	14.02	15.0	2.6	247	68.0	7.6
10/19/78	14.52	15.0	2.2	250		
10/19/78	15.02	15.0	2.6	241	68.0	7.5
10/19/78	15.52	15.0	2.8	258		
10/19/78	16.03	15.0	2.4	254	68.0	7.5
10/19/78	16.52	15.0	0.6	260		
10/19/78	17.02	15.0	2.7	251	66.0	7.5
10/19/78	17.52	15.0	2.8	250		
10/19/78	18.03	15.0	3.2	250	66.0	7.3
10/19/78	18.53	15.0	3.2	254		
10/19/78	19.02	14.0	2.6	250	--	7.3
10/19/78	19.53	12.5	2.8	250		
10/19/78	20.03	12.5	2.4	250	62.0	7.2
10/19/78	20.53	12.5	2.4	252		
10/19/78	21.02	12.5	2.0	240	62.0	7.2
10/19/78	21.52	12.5	1.8	242		
10/19/78	22.02	12.5	1.7	250	62.0	7.1
10/19/78	22.52	12.0	1.4	250		
10/19/78	23.02	12.0	1.0	250	60.0	6.9
10/19/78	23.52	12.0	0.8	260		
10/20/78	0.03	11.0	0.4	260	62.0	7.0
10/20/78	0.52	10.0	1.6	296		
10/20/78	1.02	11.0	0.6	80	62.0	6.9
10/20/78	1.52	11.0	1.1	88		
10/20/78	2.03	11.0	1.4	86	62.0	7.1
10/20/78	2.52	11.0	1.6	86		
10/20/78	3.02	12.0	1.8	82	62.0	7.0
10/20/78	3.52	12.0	1.9	86		
10/20/78	4.02	12.0	1.8	90	64.0	7.2
10/20/78	4.57	12.0	2.0	90		
10/20/78	5.02	12.0	1.8	90	64.0	7.2
10/20/78	5.52	12.0	1.8	70		
10/20/78	7.52	12.0	1.0	118	64.0	7.3
10/20/78	8.02	12.0	0.8	180		
10/20/78	8.52	12.0	0.7	222		
10/20/78	9.02	11.0	0.8	230		
			Bottom			
10/19/78	9.50	30.0	1.8	230	66.0	7.5
10/19/78	9.98	30.0	0.8	240	65.0	7.6
10/19/78	10.50	30.0	1.0	248	66.0	7.5
10/19/78	11.00	30.0	1.2	248	68.0	7.4
10/19/78	11.50	30.0	1.9	248	72.0	7.6
10/19/78	12.00	30.0	1.8	236	70.0	7.7
10/19/78	12.50	30.0	1.8	242	70.0	7.5
10/19/78	13.00	30.0	2.2	246	68.0	7.6
10/19/78	13.50	30.0	0.8	238	68.0	7.6
10/19/78	14.00	30.0	1.1	239	68.0	7.6
10/19/78	14.50	30.0	1.0	234		

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station BA (Continued)			
			Bottom (Continued)			
10/19/78	15.00	30.0	1.8	241	68.0	7.5
10/19/78	15.50	30.0	1.8	248		
10/19/78	16.00	30.0	2.2	258	68.0	7.4
10/19/78	16.50	30.0	1.7	248		
10/19/78	17.00	30.0	1.2	240	66.0	7.5
10/19/78	17.50	30.0	1.6	268		
10/19/78	18.00	30.0	1.7	250	66.0	7.3
10/19/78	18.50	30.0	1.8	245		
10/19/78	19.00	28.0	2.1	250	--	7.3
10/19/78	19.50	25.0	1.9	246		
10/19/78	20.00	25.0	1.8	250	62.0	7.2
10/19/78	20.50	25.0	1.8	244		
10/19/78	21.00	25.0	1.8	225	62.0	7.2
10/19/78	21.50	25.0	1.4	228		
10/19/78	22.00	25.0	2.2	230	62.0	7.1
10/19/78	22.50	24.0	1.1	254		
10/19/78	23.00	24.0	0.8	250	60.0	6.9
10/19/78	23.50	24.0	0.8	270		
10/20/78	0.02	22.0	0.8	270	62.0	6.9
10/20/78	0.50	20.0	1.8	280		
10/20/78	1.00	22.0	0.8	40	62.0	7.0
10/20/78	1.50	22.0	1.0	88		
10/20/78	2.00	22.0	1.1	88	62.0	6.8
10/20/78	2.50	22.0	1.3	92		
10/20/78	3.00	24.0	1.9	92	62.0	7.1
10/20/78	3.50	24.0	1.7	98		
10/20/78	4.00	24.0	1.4	100	64.0	7.1
10/20/78	4.55	24.0	1.2	78		
10/20/78	5.00	24.0	1.6	92	64.0	7.2
10/20/78	5.50	24.0	1.4	90		
10/20/78	7.50	24.0	1.2	116	64.0	7.3
10/20/78	8.00	24.0	0.8	274	62.0	7.4
10/20/78	8.50	24.0	0.4	280		
10/20/78	9.00	22.0	0.6	242		
			Station CA			
			Surface			
10/19/78	8.32	3.0	0.0	49	60.0	7.9
10/19/78	9.13	3.0	0.1	348	64.0	7.8
10/19/78	10.15	3.0	0.6	350	65.0	7.9
10/19/78	11.10	3.0	0.8	318	65.0	8.0
10/19/78	12.10	3.0	1.1	328	65.0	7.9
10/19/78	13.13	3.0	1.1	328	65.0	7.9
10/19/78	14.12	3.0	1.3	328	65.0	7.7
10/19/78	15.13	3.0	1.3	330	65.0	7.7
10/19/78	16.10	3.0	1.3	330	65.0	7.6
10.19/78	17.12	3.0	1.3	330	66.0	7.6
10/19/78	18.10	3.0	1.2	330	66.0	7.6
10/19/78	19.08	3.0	1.0	332	65.0	7.5
10/19/78	20.07	3.0	0.8	328	64.0	7.5
10/19/78	21.10	3.0	0.5	336	64.0	7.5
10/19/78	22.13	3.0	0.3	328	62.0	7.5
10/19/78	23.10	3.0	0.0	308	62.0	7.4
10/20/78	0.13	3.0	0.0	328	63.0	7.4
10/20/78	1.13	3.0	0.2	144	64.0	7.4
10/20/78	2.17	3.0	0.5	146	64.0	7.5
10/20/78	3.10	3.0	1.0	146	64.0	7.6
10/20/78	4.13	3.0	0.9	146	64.0	7.6
10/20/78	5.17	3.0	0.8	148	64.0	7.6
10/20/78	6.10	3.0	0.7	150	64.0	7.7
10/20/78	7.12	3.0	0.4	152	64.0	7.7
10/20/78	8.53	3.0	0.2	124	64.0	7.6
10/20/78	9.10	3.0	0.0	60	64.0	7.7
			Middepth			
10/19/78	8.28	11.3	0.0	242	60.0	8.0
10/19/78	9.10	12.7	0.1	314	64.0	8.1
10/19/78	10.12	12.2	0.6	342	68.0	8.1
10/19/78	11.07	12.5	0.8	318	66.0	8.0
10/19/78	12.07	12.0	1.0	330	65.0	8.0
10/19/78	13.10	12.3	0.9	330	65.0	7.9
10/19/78	14.08	12.5	1.1	330	65.0	7.8
10/19/78	15.10	12.5	1.1	326	65.0	7.7
10/19/78	16.07	12.6	1.2	330	65.0	7.7
10/19/78	17.08	12.4	1.2	330	66.0	7.6
10/19/78	18.07	12.5	1.1	324	66.0	7.6
10/19/78	19.05	12.3	1.0	330	65.0	7.5
10/19/78	20.03	12.3	0.6	326	64.0	7.5
10/19/78	21.07	12.7	0.4	328	64.0	7.5
10/19/78	22.10	12.5	0.2	326	62.0	7.5
10/19/78	23.07	13.2	0.0	306	62.0	7.4
10/20/78	0.10	13.6	0.0	288	63.0	7.4
10/20/78	1.10	12.7	0.2	144	64.0	7.4
10/20/78	2.13	13.1	0.5	146	64.0	7.5
10/20/78	3.07	12.7	0.7	150	64.0	7.7
10/20/78	4.10	13.0	0.8	154	64.0	7.6
10/20/78	5.13	12.6	0.7	150	64.0	7.6
10/20/78	6.07	12.7	0.5	154	64.0	7.7
10/20/78	7.08	13.0	0.2	168	64.0	7.7
10/20/78	8.50	12.5	0.1	136	64.0	7.7
10/20/78	9.07	12.4	0.0	70	64.0	7.7

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station CA (Continued)			
			Bottom			
10/19/78	8.25	22.6	0.0	90	62.0	7.9
10/19/78	9.07	24.4	0.1	320	63.0	8.0
10/19/78	10.08	24.4	0.1	340	68.0	8.2
10/19/78	11.03	25.0	0.3	320	68.0	8.0
10/19/78	12.03	24.0	0.6	316	65.0	8.0
10/19/78	13.07	24.6	0.9	324	65.0	7.9
10.19/78	14.05	25.0	0.7	318	65.0	7.8
10/19/78	15.07	25.0	0.7	324	65.0	7.7
10/19/78	16.03	25.2	0.8	318	65.0	7.7
10/19/78	17.05	24.8	0.7	330	66.0	7.6
10/19/78	18.03	25.0	0.7	322	66.0	7.6
10/19/78	19.02	24.6	0.6	318	65.0	7.6
10/19/78	20.00	24.6	0.5	326	64.0	7.5
10/19/78	21.03	25.4	0.2	328	64.0	7.6
10/19/78	22.07	25.0	0.1	328	62.0	7.5
10/19/78	23.03	26.4	0.0	294	62.0	7.4
10/20/78	0.07	27.2	0.0	222	63.0	7.5
10/20/78	1.07	25.4	0.1	140	64.0	7.5
10/20/78	2.10	26.2	0.2	148	64.0	7.5
10/20/78	3.03	25.4	0.5	150	64.0	7.7
10/20/78	4.07	26.0	0.5	150	64.0	7.7
10/20/78	5.10	25.2	0.7	146	64.0	7.7
10/20/78	6.03	25.4	0.2	150	64.0	7.7
10/20/78	7.05	26.0	0.1	172	64.0	7.7
10/20/78	8.47	25.0	0.1	150	64.0	7.8
10/20/78	9.03	24.8	0.0	50	64.0	7.7
			Station CB			
			Surface			
10/19/78	8.47	3.0	0.2	332	62.0	8.1
10/19/78	9.25	3.0	0.2	342	64.0	7.9
10/19/78	10.27	3.0	0.8	332	64.0	8.0
10/19/78	11.22	3.0	1.2	220	65.0	7.9
10/19/78	12.23	3.0	1.4	324	65.0	7.9
10/19/78	13.23	3.0	1.5	324	65.0	7.9
10/19/78	14.22	3.0	1.5	326	65.0	7.8
10/19/78	15.22	3.0	1.6	326	65.0	7.7
10/19/78	16.20	3.0	1.5	322	65.0	7.6
10/19/78	17.20	3.0	1.5	328	66.0	7.5
10/19/78	18.20	3.0	1.4	328	66.0	7.6
10/19/78	19.17	3.0	1.3	326	65.0	7.5
10/19/78	20.15	3.0	1.0	322	64.0	7.5
10/19/78	21.20	3.0	0.7	328	64.0	7.5
10/19/78	22.23	3.0	0.1	328	62.0	7.4
10/19/78	23.20	3.0	0.1	326	62.0	7.4
10/20/78	0.22	3.0	0.0	256	63.0	7.5
10/20/78	1.20	3.0	0.2	145	64.0	7.4
10/20/78	2.27	3.0	0.6	152	64.0	7.4
10/20/78	3.20	3.0	0.9	154	64.0	7.5
10/20/78	4.22	3.0	1.0	146	64.0	7.5
10/20/78	5.28	3.0	1.0	142	64.0	7.5
10/20/78	6.18	3.0	0.9	140	64.0	7.6
10/20/78	7.20	3.0	0.5	154	64.0	7.6
10/20/78	8.43	3.0	0.0	140	64.0	7.6
10/20/78	9.22	3.0	0.1	178	64.0	7.3
			Middepth			
10/19/78	8.43	21.0	0.0	236	62.0	8.2
10/19/78	9.22	21.5	0.2	342	64.0	8.3
10/19/78	10.23	21.4	0.6	322	64.0	8.0
10/19/78	11.18	21.9	1.1	334	64.0	7.9
10/19/78	12.20	21.9	1.3	320	65.0	7.9
10/19/78	13.20	22.0	1.5	324	65.0	7.9
10/19/78	14.18	22.2	1.5	324	65.0	7.7
10/19/78	15.18	21.9	1.5	326	65.0	7.7
10/19/78	16.17	22.0	1.5	330	65.0	7.6
10/19/78	17.17	22.2	1.5	330	66.0	7.5
10/19/78	18.17	21.8	1.4	328	66.0	7.6
10/19/78	19.13	21.7	1.1	328	65.0	7.5
10/19/78	20.12	21.7	1.1	326	64.0	7.6
10/19/78	21.17	21.7	0.6	328	64.0	7.5
10/19/78	22.20	22.1	0.4	322	62.0	7.4
10/19/78	23.17	22.2	0.1	328	62.0	7.4
10/20/78	0.18	22.5	0.0	146	63.0	7.4
10/20/78	1.17	23.0	0.1	146	64.0	7.5
10/20/78	2.23	23.0	0.5	144	64.0	7.6
10/20/78	3.17	23.3	0.7	148	64.0	7.6
10/20/78	4.18	23.4	0.9	149	64.0	7.5
10/20/78	5.25	23.5	0.9	154	64.0	7.6
10/20/78	6.15	23.3	0.8	150	64.0	7.6
10/20/78	7.17	23.3	0.4	182	64.0	7.6
10/20/78	8.40	22.8	0.1	184	64.0	7.6
10/20/78	9.18	23.0	0.0	178	64.0	7.7
			Bottom			
10/19/78	8.40	42.0	0.8	210	60.0	7.8
10/19/78	9.18	43.0	0.1	280	64.0	8.0
10/19/78	10.20	42.0	0.2	316	64.0	8.2
10/19/78	11.15	41.8	0.9	318	65.0	8.0

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station CB (Continued)			
			Bottom (Continued)			
10/19/78	12.17	43.8	0.9	320	65.0	7.9
10/19/78	13.17	44.0	1.0	324	65.0	7.9
10/19/78	14.15	44.4	1.3	324	65.0	7.7
10/19/78	15.15	43.8	1.3	332	65.0	7.7
10/19/78	16.13	44.0	1.2	322	65.0	7.6
10/19/78	17.13	44.4	1.0	328	66.0	7.5
10/19/78	18.13	43.6	1.3	330	66.0	7.6
10/19/78	19.10	43.4	1.1	326	65.0	7.5
10/19/78	20.08	43.4	0.7	324	64.0	7.5
10/19/78	21.13	43.4	0.5	324	64.0	7.5
10/19/78	22.17	44.2	0.2	224	62.0	7.5
10/19/78	23.13	44.4	0.0	326	62.0	7.4
10/20/78	0.15	45.0	0.0	156	63.0	7.4
10/20/78	1.13	46.0	0.0	116	64.0	7.5
10/20/78	2.20	46.0	0.1	150	64.0	7.6
10/20/78	3.13	46.6	0.3	150	64.0	7.6
10/20/78	4.15	46.8	0.6	150	64.0	7.6
10/20/78	5.22	47.0	0.4	160	64.0	7.6
10/20/78	6.12	46.6	0.5	154	64.0	7.6
10/20/78	7.13	46.6	0.4	180	64.0	7.7
10/20/78	8.37	45.6	0.1	198	64.0	7.6
10/20/78	9.15	46.0	0.0	202	64.0	7.7
			Station CD			
			Surface			
10/19/78	9.95	3.0	0.0	65	64.0	8.0
10/19/78	10.40	3.0	0.2	66	64.0	8.0
10/19/78	11.40	3.0	0.4	68	65.0	7.9
10/19/78	12.37	3.0	0.5	54	65.0	7.9
10/19/78	13.37	3.0	0.5	80	65.0	7.8
10/19/78	14.38	3.0	0.6	60	65.0	7.7
10/19/78	15.35	3.0	0.7	63	65.0	7.6
10/19/78	16.42	3.0	0.9	62	65.0	7.5
10/19/78	17.32	3.0	0.8	52	66.0	7.5
10/19/78	18.47	3.0	0.8	54	66.0	7.5
10/19/78	19.30	3.0	0.6	60	65.0	7.6
10/19/78	20.30	3.0	0.5	58	64.0	7.5
10/19/78	21.37	3.0	0.3	72	64.0	7.4
10/19/78	22.43	3.0	0.0	52	62.0	7.4
10/19/78	23.38	3.0	0.0	40	62.0	7.4
10/20/78	0.53	3.0	0.1	220	63.0	7.4
10/20/78	1.35	3.0	0.3	234	64.0	7.4
10/20/78	2.40	3.0	0.5	242	64.0	7.5
10/20/78	3.35	3.0	0.5	236	64.0	7.9
10/20/78	4.37	3.0	0.5	240	64.0	8.2
10/20/78	5.43	3.0	0.5	242	64.0	8.3
10/20/78	6.48	3.0	0.8	240	64.0	8.3
10/20/78	7.45	3.0	0.3	226	64.0	8.3
10/20/78	8.17	3.0	0.1	220	64.0	8.3
10/20/78	9.62	3.0	0.0	16	64.0	8.2
			Middepth			
10/19/78	9.83	10.0	0.0	69	64.0	7.9
10/19/78	10.37	8.7	0.2	74	64.0	8.0
10/19/78	11.37	9.5	0.3	55	65.0	7.9
10/19/78	12.33	8.7	0.5	65	65.0	7.9
10/19/78	13.33	9.5	0.5	64	65.0	7.7
10/19/78	14.35	9.5	0.6	66	65.0	7.7
10/19/78	15.32	9.5	0.8	65	65.0	7.6
10/19/78	16.38	9.7	0.7	66	65.0	7.5
10/19/78	17.28	9.4	0.7	63	66.0	7.5
10/19/78	18.43	9.4	0.7	60	66.0	7.5
10/19/78	19.27	9.2	0.6	68	65.0	7.5
10/19/78	20.27	8.8	0.3	64	64.0	7.5
10/19/78	21.33	9.7	0.3	64	64.0	7.4
10/19/78	22.40	7.8	0.0	52	62.0	7.4
10/19/78	23.35	9.3	0.0	28	62.0	7.4
10/20/78	0.50	8.5	0.1	208	63.0	7.4
10/20/78	1.32	10.1	0.3	240	64.0	7.4
10/20/78	2.37	10.4	0.4	242	64.0	7.5
10/20/78	3.32	10.0	0.7	238	64.0	7.9
10/20/78	4.33	10.7	0.5	244	64.0	8.2
10/20/78	5.40	10.2	0.5	246	64.0	8.3
10/20/78	6.45	10.7	0.5	246	64.0	8.2
10/20/78	7.42	10.4	0.3	248	64.0	8.3
10/20/78	8.13	10.0	0.1	256	64.0	8.3
10/20/78	9.58	10.6	0.0	34	64.0	8.2
			Bottom			
10/19/78	9.80	20.0	0.0	42	65.0	8.2
10/19/78	10.33	17.4	0.1	100	64.0	8.0
10/19/78	11.33	19.0	0.3	56	66.0	8.0
10/19/78	12.30	17.4	0.3	88	65.0	7.9
10/19/78	13.30	19.0	0.4	54	65.0	7.8
10/19/78	14.32	19.0	0.6	66	65.0	7.7
10/19/78	15.28	19.0	0.7	60	65.0	7.6
10/19/78	16.35	19.4	0.6	60	65.0	7.6
10/19/78	17.25	18.8	0.7	64	66.0	7.5
10/19/78	18.40	18.8	0.6	62	66.0	7.6
10/19/78	19.23	18.4	0.5	58	65.0	7.5

(Continued)

Table 11 (Continued)

Time: Date	Time: Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station CD (Continued)			
			Bottom (Continued)			
10/19/78	20.23	17.6	0.2	328	64.0	7.4
10/19/78	21.30	19.4	0.2	50	64.0	7.5
10/19/78	22.37	15.6	0.0	30	62.0	7.4
10/19/78	23.32	18.6	0.0	32	62.0	7.4
10/20/78	0.47	17.0	0.0	150	63.0	7.4
10/20/78	1.28	20.2	0.2	234	64.0	7.5
10/20/78	2.33	20.8	0.1	248	64.0	7.5
10/20/78	3.28	20.0	0.3	234	64.0	7.9
10/20/78	4.30	21.4	0.5	256	64.0	8.3
10/20/78	5.37	20.4	0.4	244	64.0	8.3
10/20/78	6.42	21.4	0.2	248	64.0	8.3
10/20/78	7.38	20.8	0.4	252	64.0	8.3
10/20/78	8.10	20.0	0.0	242	64.0	8.3
10/20/78	9.55	21.2	0.0	40	64.0	8.3
			Station CE			
			Surface			
10/19/78	8.85	3.0	0.0	318	61.0	7.9
10/19/78	9.40	3.0	0.0	350		
10/19/78	10.72	3.0	0.0	140	64.0	7.8
10/19/78	11.53	3.0	0.1	264	65.0	7.9
10/19/78	12.48	3.0	0.0	48	65.0	7.9
10/19/78	13.48	3.0	0.1	138	65.0	7.9
10/19/78	14.42	3.0	0.1	230	65.0	7.9
10/19/78	15.45	3.0	0.1	242	65.0	7.9
10/19/78	16.30	3.0	0.1	214		
10/19/78	17.42	3.0	0.1	278	66.0	7.8
10/19/78	18.33	3.0	0.0	256	66.0	7.6
10/19/78	19.45	3.0	0.0	246	64.0	7.5
10/19/78	20.43	3.0	0.2	268	64.0	7.5
10/19/78	21.52	3.0	0.0	246	64.0	7.6
10/19/78	22.57	3.0	0.1	230	62.0	7.4
10/19/78	23.50	3.0	0.0	200	62.0	7.4
10/20/78	0.40	3.0	0.0	242	63.0	7.4
10/20/78	1.48	3.0	0.1	210	64.0	7.4
10/20/78	2.57	3.0	0.1	258	64.0	7.4
10/20/78	3.47	3.0	0.0	280	64.0	7.4
10/20/78	4.50	3.0	0.0	170	64.0	7.4
10/20/78	5.57	3.0	0.0	350	64.0	7.5
10/20/78	6.35	3.0	0.0	224	64.0	7.5
10/20/78	7.32	3.0	0.0	90	64.0	7.5
10/20/78	8.33	3.0	0.1	252	64.0	7.5
10/20/78	9.45	3.0	0.0	94	64.0	7.4
			Middepth			
10/19/78	8.82	6.5	0.0	314	61.0	7.9
10/19/78	9.37	6.8	0.1	290		
10/19/78	10.67	6.8	0.0	108	64.0	7.9
10/19/78	11.50	7.6	0.0	156	65.0	7.9
10/19/78	12.45	8.1	0.0	202	65.0	7.9
10/19/78	13.45	4.9	0.0	130	65.0	7.9
10/19/78	14.38	7.0	0.1	220	65.0	7.9
10/19/78	15.42	7.2	0.1	250	65.0	7.9
10/19/78	16.27	6.2	0.1	214	65.0	7.8
10/19/78	17.38	7.8	0.1	272	66.0	7.7
10/19/78	18.30	6.3	0.0	200	66.0	7.6
10/19/78	19.42	7.5	0.0	186	64.0	7.6
10/19/78	20.40	7.2	0.0	222	64.0	7.6
10/19/78	21.48	8.0	0.0	240	64.0	7.6
10/19/78	22.53	6.9	0.0	232	62.0	7.5
10/19/78	23.47	6.3	0.0	240	62.0	7.4
10/20/78	0.37	7.5	0.0	242	63.0	7.4
10/20/78	1.45	6.8	0.0	214	64.0	7.4
10/20/78	2.53	6.8	0.1	260	64.0	7.4
10/20/78	3.43	7.1	0.0	310	64.0	7.4
10/20/78	4.47	8.5	0.0	90	64.0	7.4
10/20/78	5.53	8.1	0.0	318	64.0	7.5
10/20/78	6.32	7.9	0.0	224	64.0	7.5
10/20/78	7.28	7.9	0.0	130	64.0	7.5
10/20/78	8.30	7.2	0.0	270	64.0	7.4
10/20/78	9.42	7.0	0.0	122	64.0	7.5
			Bottom			
10/19/78	8.78	13.0	0.0	10	60.0	7.9
10/19/78	9.33	13.6	0.0	280		
10/19/78	10.50	13.6	0.1	194	64.0	7.9
10/19/78	11.47	15.2	0.0	172	65.0	7.9
10/19/78	12.42	16.2	0.1	274	65.0	7.9
10/19/78	13.42	9.8	0.0	158	65.0	7.9
10/19/78	14.35	14.0	0.0	210	65.0	7.9
10/19/78	15.38	14.4	0.1	216	65.0	7.9
10/19/78	16.23	12.4	0.1	210	65.0	7.8
10/19/78	17.35	15.6	0.0	152	66.0	7.7
10/19/78	18.27	12.6	0.1	319	66.0	7.7
10/19/78	19.38	15.0	0.0	136	64.0	7.7
10/19/78	20.37	14.4	0.0	174	64.0	7.7
10/19/78	21.45	16.0	0.0	240	64.0	7.6
10/19/78	22.50	13.8	0.0	234	62.0	7.5
10/19/78	23.43	12.6	0.0	270	62.0	7.5
10/20/78	0.33	15.0	0.0	242	63.0	7.3

(Continued)

Table 11 (Continued)

Time: Date	Time: Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station CE (Continued)			
			Bottom (Continued)			
10/20/78	1.42	13.6	0.0	206	64.0	7.4
10/20/78	2.50	13.6	0.0	248	64.0	7.4
10/20/78	3.40	14.2	0.0	316	64.0	7.4
10/20/78	4.43	17.0	0.0	140	64.0	7.4
10/20/78	5.50	16.2	0.0	254	64.0	7.5
10/20/78	6.28	15.8	0.0	194	64.0	7.5
10/20/78	7.25	15.8	0.0	116	64.0	7.5
10/20/78	8.27	14.4	0.0	258	64.0	7.5
10/20/78	9.38	14.0	0.0	150	64.0	7.4
			Station DA			
			Surface			
10/19/78	9.73	3.0	0.6	344	66.0	7.8
10/19/78	10.07	3.0	2.2	320	66.0	7.9
10/19/78	10.37	3.0	1.8	320	65.0	7.8
10/19/78	12.08	3.0	2.7	327	66.0	7.9
10/19/78	13.08	3.0	2.8	328	66.0	7.9
10/19/78	14.07	3.0	3.1	328	66.0	7.9
10/19/78	15.07	3.0	3.2	326	66.0	7.6
10/19/78	16.07	3.0	3.2	328	66.0	7.4
10/19/78	17.07	3.0	3.0	323	66.0	7.5
10/19/78	18.07	3.0	2.8	323	66.0	7.5
10/19/78	19.07	3.0	2.4	325	66.0	7.5
10/19/78	20.07	3.0	1.9	330	66.0	7.5
10/19/78	21.07	3.0	1.3	330	66.0	7.5
10/19/78	22.07	3.0	1.0	338	66.0	7.5
10/19/78	23.07	3.0	0.4	348	66.0	7.5
10/20/78	0.08	3.0	0.0	260	66.0	7.4
10/20/78	1.07	3.0	0.4	142	66.0	7.4
10/20/78	2.12	3.0	1.2	144	65.0	7.5
10/20/78	3.07	3.0	1.8	128	64.0	7.5
10/20/78	4.07	3.0	1.2	145	65.0	7.5
10/20/78	5.07	3.0	1.0	142	65.0	7.5
10/20/78	6.07	3.0	1.2	152	64.0	7.6
10/20/78	7.07	3.0	0.6	150	64.0	7.6
10/20/78	8.07	3.0	0.5	130	64.0	7.6
10/20/78	9.07	3.0	0.2	40	65.0	7.6
			Middepth			
10/19/78	9.70	17.7	1.1	330	66.0	7.8
10/19/78	10.33	20.0	1.4	316	66.0	8.2
10/19/78	11.03	20.0	2.2	320	66.0	7.9
10/19/78	12.07	19.6	2.5	320	66.0	7.9
10/19/78	13.05	20.0	2.6	322	66.0	7.9
10/19/78	14.03	20.0	2.8	320	60.C	7.8
10/19/78	15.03	19.7	2.8	322	66.0	7.6
10/19/78	16.03	20.0	2.7	320	66.0	7.4
10/19/78	17.03	19.9	2.4	326	66.0	7.5
10/19/78	18.03	19.7	2.4	322	66.0	7.5
10/19/78	19.03	19.3	2.2	322	66.0	7.5
10/19/78	20.03	19.8	1.6	322	66.0	7.5
10/19/78	21.03	20.0	1.2	322	66.0	7.5
10/19/78	22.03	20.1	0.8	325	66.0	7.5
10/19/78	23.03	20.0	0.3	336	66.0	7.4
10/20/78	0.05	19.6	0.0	274	66.0	7.4
10/20/78	1.03	20.5	0.4	138	66.0	7.4
10/20/78	2.08	21.8	1.0	138	65.0	7.5
10/20/78	3.03	20.9	1.1	130	64.0	7.6
10/20/78	4.03	21.7	1.2	160	65.0	7.5
10/20/78	5.03	21.4	1.2	146	64.0	7.5
10/20/78	6.03	21.4	1.1	134	64.0	7.6
10/20/78	7.03	21.1	0.6	138	64.0	7.6
10/20/78	8.03	21.1	0.3	144	64.0	7.6
10/20/78	9.03	14.3	0.1	42	65.0	7.6
			Bottom			
10/19/78	9.67	35.4	0.4	336	--	8.4
10/19/78	10.28	40.0	0.6	322	66.0	8.3
10/19/78	11.00	40.0	1.4	320	66.0	8.0
10/19/78	12.00	39.2	1.8	323	66.0	7.9
10/19/78	13.00	40.0	2.2	318	66.0	7.9
10/19/78	14.00	40.0	1.8	310	66.0	7.8
10/19/78	15.00	39.5	1.7	314	66.0	7.7
10/19/78	16.00	40.0	1.2	320	66.0	7.5
10/19/78	17.00	39.8	1.8	320	66.0	7.5
10/19/78	18.00	39.4	1.9	320	66.0	7.5
10/19/78	19.00	38.6	1.6	316	66.0	7.5
10/19/78	20.00	39.6	1.2	312	65.0	7.5
10/19/78	21.00	40.0	1.0	312	66.0	7.5
10/19/78	22.00	40.2	0.3	318	66.0	7.5
10/19/78	23.00	40.0	0.2	313	66.0	7.5
10/20/78	24.00	39.2	0.1	9	66.0	7.4
10/20/78	1.00	41.0	0.1	132	66.0	7.4
10/20/78	2.05	43.6	0.4	132	65.0	7.6
10/20/78	3.00	41.8	0.6	140	64.0	7.6
10/20/78	4.00	43.4	0.8	140	64.0	7.5
10/20/78	5.00	42.9	0.8	142	63.0	7.5
10/20/78	6.00	42.8	0.6	140	64.0	7.6
10/20/78	7.00	42.2	0.4	142	64.0	7.6
10/20/78	8.00	42.2	0.2	96	64.0	7.6
10/20/78	9.00	28.6	0.0	354	65.0	7.6

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station DB			
			Surface			
10/19/78	9.92	3.0	1.3	330	65.0	7.9
10/19/78	10.45	3.0	1.5	324	65.0	7.8
10/19/78	11.18	3.0	2.0	320	65.0	7.9
10/19/78	12.20	3.0	2.5	324	66.0	7.8
10/19/78	13.23	3.0	2.9	326	--	7.8
10/19/78	14.15	3.0	3.0	328	66.0	7.7
10/19/78	15.18	3.0	3.0	326	66.0	7.6
10/19/78	16.20	3.0	3.4	328	66.0	7.4
10/19/78	17.20	3.0	3.0	326	66.0	7.5
10/19/78	18.20	3.0	3.0	326	66.0	7.5
10/19/78	19.20	3.0	2.6	326	66.0	7.5
10/19/78	20.23	3.0	2.0	330	66.0	7.5
10/19/78	21.22	3.0	1.4	332	66.0	7.4
10/19/78	22.20	3.0	0.9	336	66.0	7.4
10/19/78	23.23	3.0	0.4	350	66.0	7.4
10/20/78	0.28	3.0	0.2	62	66.0	7.4
10/20/78	1.27	3.0	0.5	122	66.0	7.4
10/20/78	2.32	3.0	1.4	132	65.0	7.5
10/20/78	3.23	3.0	1.7	145	65.0	7.5
10/20/78	4.35	3.0	2.0	146	65.0	7.5
10/20/78	5.22	3.0	1.8	145	65.0	7.5
10/20/78	6.20	3.0	1.4	150	65.0	7.5
10/20/78	7.23	3.0	1.1	144	64.0	7.5
10/20/78	8.20	3.0	0.4	140	64.0	7.5
10/20/78	9.30	3.0	0.3	36	65.0	7.5
			Middepth			
10/19/78	9.87	18.8	1.2	326	66.0	8.0
10/19/78	10.42	18.7	1.6	316	65.0	8.0
10/19/78	11.15	18.5	2.0	318	65.0	7.9
10/19/78	12.18	18.7	2.3	318	66.0	7.9
10/19/78	13.20	18.7	2.9	318	66.0	7.8
10/19/78	14.13	18.6	2.9	320	66.0	7.8
10/19/78	15.15	18.7	2.9	322	66.0	7.6
10/19/78	16.17	18.8	3.1	326	66.0	7.4
10/19/78	17.17	18.8	2.8	320	66.0	7.5
10/19/78	18.17	18.6	2.5	324	66.0	7.5
10/19/78	19.17	18.5	2.2	324	66.0	7.5
10/19/78	20.20	18.7	1.6	324	66.0	7.5
10/19/78	21.18	18.7	1.3	328	66.0	7.5
10/19/78	22.17	18.8	0.8	324	66.0	7.4
10/19/78	23.20	18.6	0.4	358	66.0	7.4
10/20/78	0.25	18.3	0.2	100	66.0	7.4
10/20/78	1.23	18.2	0.7	141	66.0	7.5
10/20/78	2.28	18.2	1.3	138	65.0	7.5
10/20/78	3.20	18.1	1.5	142	65.0	7.5
10/20/78	4.32	18.2	2.0	140	65.0	7.5
10/20/78	5.18	18.0	1.8	140	65.0	7.5
10/20/78	6.17	18.0	1.6	140	65.0	7.5
10/20/78	7.20	17.9	1.0	142	64.0	7.6
10/20/78	8.17	17.8	0.4	135	64.0	7.6
10/20/78	9.27	18.0	0.2	40	65.0	7.6
			Bottom			
10/19/78	9.83	37.6	0.6	318	66.0	8.2
10/19/78	10.38	37.4	0.8	322	66.0	8.2
10/19/78	11.12	37.0	1.4	313	66.0	8.0
10/19/78	12.15	37.5	1.6	323	66.0	7.8
10/19/78	13.17	37.2	2.0	314	66.0	7.9
10/19/78	14.10	37.3	2.0	320	66.0	7.8
10/19/78	15.12	37.4	1.8	314	67.0	7.6
10/19/78	16.13	37.6	2.1	320	66.0	7.4
10/19/78	17.13	37.6	1.7	318	66.0	7.5
10/19/78	18.13	37.2	1.7	318	66.0	7.4
10/19/78	19.13	37.0	1.8	320	66.0	7.5
10/19/78	20.17	37.4	1.2	322	66.0	7.5
10/19/78	21.15	37.4	0.8	324	66.0	7.5
10/19/78	22.13	37.6	0.6	318	66.0	7.4
10/19/78	23.17	37.2	0.2	326	66.0	7.4
10/20/78	0.22	36.6	0.3	130	66.0	7.4
10/20/78	1.20	36.4	0.6	135	66.0	7.6
10/20/78	2.25	36.4	0.8	130	65.0	7.5
10/20/78	3.17	36.2	1.0	145	65.0	7.5
10/20/78	4.28	36.4	1.4	135	64.0	7.5
10/20/78	5.15	36.0	1.4	136	64.0	7.5
10/20/78	6.13	36.0	1.2	130	64.0	7.5
10/20/78	7.17	35.8	0.8	145	64.0	7.5
10/20/78	8.13	35.6	0.1	145	64.0	7.6
10/20/78	9.23	36.1	0.0	230	65.0	7.6
			Station DC			
			Surface			
10/19/78	10.08	3.0	1.5	332	65.0	7.8
10/19/78	10.60	3.0	1.8	333	65.0	7.9
10/19/78	11.32	3.0	2.3	332	66.0	7.9
10/19/78	12.37	3.0	2.3	334	66.0	7.9
10/19/78	13.35	3.0	2.7	332	--	7.8
10/19/78	14.28	3.0	2.9	332	66.0	7.7
10/19/78	15.32	3.0	2.7	329	66.0	7.6
10/19/78	16.35	3.0	2.8	332	66.0	7.5

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station DC (Continued)			
			Surface (Continued)			
10/19/78	17.35	3.0	2.7	330	66.0	7.5
10/19/78	18.33	3.0	2.5	328	66.0	7.5
10/19/78	19.37	3.0	2.1	330	66.0	7.4
10/19/78	20.38	3.0	1.6	332	66.0	7.4
10/19/78	21.42	3.0	1.2	334	66.0	7.4
10/19/78	22.40	3.0	0.6	335	66.0	7.4
10/19/78	23.45	3.0	0.3	322	66.0	7.4
10/20/78	0.48	3.0	0.4	134	66.0	7.4
10/20/78	1.48	3.0	1.0	134	65.0	7.3
10/20/78	2.52	3.0	1.4	130	65.0	7.7
10/20/78	3.45	3.0	2.0	138	65.0	7.4
10/20/78	4.52	3.0	2.0	140	65.0	7.5
10/20/78	5.42	3.0	1.3	136	65.0	7.5
10/20/78	6.42	3.0	1.3	124	65.0	7.7
10/20/78	7.42	3.0	0.8	135	64.0	7.7
10/20/78	8.52	3.0	0.5	145	64.0	7.6
10/20/78	9.47	3.0	0.2	86	65.0	7.5
			Middepth			
10/19/78	10.05	20.8	1.4	324	66.0	8.1
10/19/78	10.57	20.7	1.6	324	65.0	7.9
10/19/78	11.28	20.7	1.9	320	66.0	7.9
10/19/78	12.33	20.7	2.1	324	66.0	7.9
10/19/78	13.32	20.6	2.2	324	66.0	7.8
10/19/78	14.25	20.4	2.3	326	66.0	7.7
10/19/78	15.28	20.2	2.2	330	66.0	7.6
10/19/78	16.32	20.6	2.3	328	66.0	7.5
10/19/78	17.32	20.0	2.2	322	66.0	7.5
10/19/78	18.30	20.0	2.1	323	66.0	7.4
10/19/78	19.33	20.6	1.8	324	66.0	7.4
10/19/78	20.35	20.5	1.3	323	66.0	7.4
10/19/78	21.38	20.5	0.9	331	66.0	7.4
10/19/78	22.37	20.9	0.4	344	66.0	7.4
10/19/78	23.42	20.8	0.1	322	66.0	7.4
10/20/78	0.45	20.5	0.2	154	66.0	7.4
10/20/78	1.45	20.4	0.8	142	65.0	7.4
10/20/78	2.48	20.3	1.2	134	65.0	7.6
10/20/78	3.42	20.2	1.7	140	65.0	7.6
10/20/78	4.48	20.3	1.6	140	65.0	7.5
10/20/78	5.38	20.3	1.0	143	65.0	7.6
10/20/78	6.38	20.2	1.2	168	65.0	7.7
10/20/78	7.38	19.9	0.7	140	64.0	7.7
10/20/78	8.48	20.4	0.2	180	64.0	7.6
10/20/78	9.43	19.6	0.2	66	65.0	7.5
			Bottom			
10/19/78	10.00	41.6	0.6	326	67.0	8.2
10/19/78	10.53	41.5	0.8	322	66.0	8.0
10/19/78	11.25	41.5	1.2	318	66.0	8.0
10/19/78	12.30	41.4	1.2	318	66.0	7.9
10/19/78	13.28	41.2	1.2	326	66.0	7.8
10/19/78	14.22	40.8	1.4	315	66.0	7.7
10/19/78	15.25	40.4	1.3	323	67.0	7.5
10/19/78	16.28	41.2	1.2	322	67.0	7.5
10/19/78	17.28	40.0	1.4	320	66.0	7.5
10/19/78	18.27	40.0	1.1	320	66.0	7.4
10/19/78	19.30	41.2	1.0	324	66.0	7.4
10/19/78	20.32	41.0	0.7	314	66.0	7.4
10/19/78	21.35	41.0	0.6	324	66.0	7.4
10/19/78	22.33	41.8	0.5	358	66.0	7.4
10/19/78	23.38	41.6	0.2	130	66.0	7.4
10/20/78	0.42	41.0	0.4	264	66.0	7.5
10/20/78	1.42	40.8	0.7	160	65.0	7.4
10/20/78	2.45	40.6	1.4	164	65.0	7.8
10/20/78	3.38	40.4	1.0	140	65.0	7.6
10/20/78	4.45	40.6	1.2	160	64.0	7.5
10/20/78	5.35	40.6	1.2	162	64.0	7.6
10/20/78	6.35	40.4	1.4	170	64.0	7.6
10/20/78	7.35	39.8	0.6	166	64.0	7.8
10/20/78	8.45	40.9	0.2	210	64.0	7.6
10/20/78	9.40	39.2	0.4	240	65.0	7.6
			Station DE			
			Surface			
10/19/78	10.20	3.0	1.5	330	65.0	7.8
10/19/78	10.72	3.0	2.0	330	65.0	7.8
10/19/78	11.45	3.0	2.6	322	66.0	7.8
10/19/78	12.48	3.0	2.8	326	66.0	7.7
10/19/78	13.47	3.0	3.0	325	66.0	7.7
10/19/78	14.40	3.0	3.2	327	66.0	7.5
10/19/78	15.43	3.0	3.3	326	66.0	7.4
10/19/78	16.47	3.0	3.0	328	66.0	7.4
10/19/78	17.48	3.0	3.0	330	66.0	7.4
10/19/78	17.52	3.0	2.4	324	66.0	7.2
10/19/78	18.45	3.0	2.8	330	66.0	7.3
10/19/78	20.53	3.0	1.9	326	66.0	7.3
10/19/78	21.63	3.0	1.4	329	66.0	7.3
10/19/78	22.57	3.0	0.8	332	66.0	7.4
10/19/78	23.62	3.0	0.2	340	66.0	7.3
10/20/78	0.65	3.0	0.2	125	66.0	7.3

(Continued)

Table 11 (Continued)

Time						
Date	Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station DE (Continued)			
			Surface			
10/20/78	1.65	3.0	0.8	150	65.0	7.4
10/20/78	2.68	3.0	1.8	142	65.0	7.4
10/20/78	3.60	3.0	1.8	143	65.0	7.4
10/20/78	4.65	3.0	2.0	146	65.0	7.4
10/20/78	5.62	3.0	1.8	145	65.0	7.5
10/20/78	6.57	3.0	1.6	130	64.0	7.5
10/20/78	7.57	3.0	0.9	138	64.0	7.5
10/20/78	8.58	3.0	0.2	250	64.0	7.5
10/20/78	9.60	3.0	0.1	174	65.0	7.5
			Middepth			
10/19/78	10.17	18.2	1.6	328	66.0	8.0
10/19/78	10.68	18.0	1.6	318	66.0	7.8
10/19/78	11.42	18.1	2.2	324	65.0	7.8
10/19/78	12.45	18.1	2.4	324	66.0	7.7
10/19/78	13.43	18.1	2.8	324	66.0	7.7
10/19/78	14.37	18.0	2.8	326	66.0	7.5
10/19/78	15.40	18.2	2.8	325	66.0	7.5
10/19/78	16.43	18.1	2.7	326	66.0	7.4
10/19/78	17.45	18.0	2.7	326	66.0	7.3
10/19/78	17.48	17.9	2.2	320	66.0	7.3
10/19/78	18.42	18.0	2.8	326	66.0	7.4
10/19/78	20.50	18.0	1.7	322	66.0	7.3
10/19/78	21.60	18.2	1.3	330	66.0	7.3
10/19/78	22.53	18.2	0.8	328	66.0	7.4
10/19/78	23.58	18.2	0.2	322	66.0	7.3
10/20/78	0.62	18.8	0.3	152	66.0	7.3
10/20/78	1.62	18.6	0.8	138	65.0	7.4
10/20/78	2.65	18.7	1.4	144	65.0	7.5
10/20/78	3.57	19.2	1.4	142	65.0	7.4
10/20/78	4.62	18.9	1.6	145	65.0	7.4
10/20/78	5.58	18.7	1.8	145	65.0	7.5
10/20/78	6.53	18.5	1.4	130	64.0	7.5
10/20/78	7.53	18.2	0.8	138	64.0	7.5
10/20/78	8.55	18.3	0.3	228	64.0	7.5
10/20/78	9.57	18.2	0.2	184	65.0	7.5
			Bottom			
10/19/78	10.13	36.5	0.6	324	66.0	8.0
10/19/78	10.65	36.0	1.2	318	66.0	8.0
10/19/78	11.38	36.2	1.2	321	66.0	7.8
10/19/78	12.42	36.2	1.7	324	66.0	7.7
10/19/78	13.40	36.2	2.0	325	66.0	8.3
10/19/78	14.33	36.0	2.5	324	67.0	7.5
10/19/78	15.37	36.4	2.2	320	66.0	7.5
10/19/78	16.40	36.2	1.7	327	65.0	7.4
10/19/78	17.42	36.0	1.9	320	66.0	7.3
10/19/78	18.38	36.0	2.0	326	66.0	7.3
10/19/78	19.45	35.8	1.4	320	66.0	7.3
10/19/78	20.47	36.0	1.0	332	66.0	7.3
10/19/78	21.57	36.4	0.7	322	66.0	7.3
10/19/78	22.50	36.4	0.4	322	66.0	7.4
10/19/78	23.55	36.4	0.0	288	66.0	7.4
10/20/78	0.58	37.6	0.2	165	66.0	7.4
10/20/78	1.58	37.2	0.6	140	65.0	7.4
10/20/78	2.62	37.4	0.8	146	65.0	7.5
10/20/78	3.53	38.4	1.8	146	65.0	7.5
10/20/78	4.58	37.8	1.1	213	86.0	7.4
10/20/78	5.55	37.4	1.4	140	65.0	7.5
10/20/78	6.50	37.0	1.2	146	64.0	7.5
10/20/78	7.50	36.4	0.5	144	64.0	7.5
10/20/78	8.52	36.7	0.3	240	64.0	7.6
10/20/78	9.53	36.4	0.2	240	65.0	7.7
			Station EA			
			Surface			
10/19/78	8.12	3.0	0.6	268	63.0	8.2
10/19/78	9.23	3.0	0.9	250	63.0	8.2
10/19/78	9.57	3.0	1.6	274		
10/19/78	10.12	3.0	1.6	270	64.0	8.1
10/19/78	10.58	3.0	1.8	252		
10/19/78	11.17	3.0	2.1	264	64.0	8.1
10/19/78	11.57	3.0	2.2	270		
10/19/78	12.10	3.0	2.2	270	65.0	7.8
10/19/78	12.63	3.0	2.4	264		
10/19/78	13.10	3.0	2.4	268	66.0	7.5
10/19/78	13.58	3.0	2.4	270		
10/19/78	14.08	3.0	2.2	270	66.0	6.8
10/19/78	14.60	3.0	2.6	274		
10/19/78	15.10	3.0	2.6	270	66.0	6.7
10/19/78	15.60	3.0	2.2	280		
10/19/78	16.08	3.0	2.6	290	66.0	6.9
10/19/78	16.60	3.0	2.4	270		
10/19/78	17.10	3.0	2.0	290	64.0	6.3
10/19/78	17.60	3.0	2.8	280		
10/19/78	18.10	3.0	2.0	280	65.0	6.8
10/19/78	18.60	3.0	2.4	300		
10/19/78	19.10	3.0	2.8	290	63.0	6.1
10/19/78	19.60	3.0	2.2	290		

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station EA (Continued)			
			Surface			
10/19/78	20.10	3.0	2.0	304	63.0	5.9
10/19/78	-3.38	3.0	2.0	290		
10/19/78	21.13	3.0	1.6	294	64.0	5.9
10/19/78	21.60	3.0	1.6	290		
10/19/78	22.12	3.0	2.2	280	64.0	5.8
10/19/78	22.57	3.0	1.0	280		
10/19/78	23.12	3.0	0.6	260	64.0	5.7
10/19/78	23.75	3.0	0.4	254		
10/20/78	0.12	3.0	0.2	290	63.0	5.7
10/20/78	0.65	3.0	0.2	320		
10/20/78	1.12	3.0	0.2	90	62.0	6.1
10/20/78	1.60	3.0	0.6	60		
10/20/78	2.13	3.0	1.2	50	63.0	6.1
10/20/78	2.65	3.0	1.6	64		
10/20/78	3.15	3.0	1.0	110	62.0	6.2
10/20/78	3.60	3.0	1.0	110		
10/20/78	4.17	3.0	1.2	120	61.0	6.3
10/20/78	4.67	3.0	1.6	90		
10/20/78	5.15	3.0	1.6	120	61.0	6.4
10/20/78	5.60	3.0	0.8	104		
10/20/78	6.30	3.0	1.0	100	61.0	6.5
10/20/78	6.67	3.0	0.6	64		
10/20/78	7.12	3.0	0.4	110	62.0	6.6
10/20/78	7.55	3.0	0.6	100		
10/20/78	8.10	3.0	0.2	50	63.0	6.6
10/20/78	8.57	3.0	0.2	330		
10/20/78	9.00	3.0	0.6	260	63.0	6.5
			Middepth			
10/19/78	8.08	22.2	0.4	268	63.0	8.9
10/19/78	9.18	22.2	1.2	256	63.0	8.9
10/19/78	9.53	22.2	1.4	270		
10/19/78	10.07	29.4	1.7	254	64.0	8.1
10/19/78	10.53	30.3	2.0	255		
10/19/78	11.08	32.4	2.0	262	64.0	8.4
10/19/78	11.53	32.2	2.8	264		
10/19/78	12.05	29.3	2.8	268	65.0	7.9
10/19/78	12.58	30.3	2.0	269		
10/19/78	13.05	30.2	1.9	270	66.0	7.3
10/19/78	13.55	30.4	2.6	268		
10/19/78	14.05	30.6	2.2	270	66.0	7.4
10/19/78	14.55	30.8	1.8	260		
10/19/78	15.05	30.5	2.6	270	66.0	7.2
10/19/78	15.55	30.8	2.8	270		
10/19/78	16.05	29.8	2.2	260	66.0	7.2
10/19/78	16.55	30.1	2.0	264		
10/19/78	17.05	30.7	2.4	262	64.0	7.1
10/19/78	17.55	30.4	2.0	270		
10/19/78	18.05	30.3	2.4	262	65.0	7.0
10/19/78	18.55	30.3	2.2	258		
10/19/78	19.05	30.0	2.0	254	63.0	6.8
10/19/78	19.55	27.4	2.2	280		
10/19/78	20.05	29.5	2.4	278	63.0	6.0
10/19/78	20.55	28.4	1.6	270		
10/19/78	21.07	28.9	1.8	290	64.0	5.9
10/19/78	21.55	29.0	1.6	280		
10/19/78	22.07	29.8	1.2	272	64.0	5.8
10/19/78	22.52	30.5	1.0	290		
10/19/78	23.07	30.3	0.5	270	64.0	5.7
10/19/78	23.70	30.6	0.4	240		
10/20/78	0.07	29.5	0.2	260	63.0	6.3
10/20/78	0.60	23.3	0.2	140		
10/20/78	1.07	22.9	0.2	92	62.0	6.1
10/20/78	1.55	26.3	0.6	60		
10/20/78	2.07	26.5	1.0	90	63.0	6.0
10/20/78	2.60	21.8	1.4	74		
10/20/78	3.10	20.5	1.6	100	62.0	6.2
10/20/78	3.55	21.0	1.4	80		
10/20/78	4.10	23.8	1.2	80	61.0	6.3
10/20/78	4.63	21.5	1.6	80		
10/20/78	5.08	24.3	1.8	90	61.0	6.4
10/20/78	5.55	22.9	1.6	70		
10/20/78	6.23	19.0	1.0	80	61.0	6.5
10/20/78	6.63	15.0	0.8	70		
10/20/78	7.07	18.5	0.8	80	62.0	6.6
10/20/78	7.48	21.5	0.8	80		
10/20/78	8.05	20.1	0.4	38	63.0	6.6
10/20/78	8.55	17.3	0.2	338		
10/20/78	8.95	21.5	0.6	300	63.0	6.6
			Bottom			
10/19/78	8.00	44.4	0.2	260	63.0	9.2
10/19/78	9.10	44.3	0.8	250	63.0	9.1
10/19/78	9.50	43.3	0.8	284		
10/19/78	10.00	59.7	0.4	280	64.0	8.9
10/19/78	10.50	60.7	1.2	272		
10/19/78	11.00	64.7	0.6	30	64.0	8.4
10/19/78	11.50	64.1	1.5	285		
10/19/78	12.00	58.5	1.8	270	65.0	8.1
10/19/78	12.53	61.5	2.2	270		
10/19/78	13.00	60.5	2.0	270	66.0	7.5
10/19/78	13.50	60.9	2.0	278		
10/19/78	14.00	61.2	2.0	268	66.0	7.4
10/19/78	14.50	61.6	2.0	262		

(Continued)

Table 11 (Continued)

Time: Date	Time: Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station EA (Continued)			
			Bottom (Continued)			
10/19/78	15.00	61.0	2.0	270	65.0	7.2
10/19/78	15.50	61.6	2.2	280		
10/19/78	16.00	59.6	1.8	290	66.0	7.2
10/19/78	16.50	60.2	2.2	260		
10/19/78	17.00	61.4	2.2	280	64.0	7.1
10/19/78	17.50	60.8	1.8	270		
10/19/78	18.00	60.6	2.0	270	65.0	7.0
10/19/78	18.50	61.5	2.0	270		
10/19/78	19.00	60.0	1.8	270	63.0	6.9
10/19/78	19.50	54.8	1.8	254		
10/19/78	20.00	59.0	0.8	240	63.0	6.4
10/19/78	20.52	56.7	1.4	240		
10/19/78	21.00	57.9	1.2	240	64.0	6.6
10/19/78	21.50	58.0	1.0	230		
10/19/78	22.00	59.6	0.6	250	64.0	6.0
10/19/78	22.48	60.7	0.6	240		
10/19/78	23.00	60.6	0.4	310	64.0	5.9
10/19/78	23.67	61.1	0.2	180		
10/20/78	24.00	59.0	0.2	120	63.0	6.3
10/20/78	0.55	46.5	0.2	70		
10/20/78	1.00	45.9	0.2	20	62.0	6.2
10/20/78	1.50	52.6	0.6	80		
10/20/78	2.00	53.0	0.6	70	63.0	6.3
10/20/78	2.53	43.5	1.2	70		
10/20/78	3.00	41.0	1.8	60	62.0	6.3
10/20/78	3.50	42.0	1.8	48		
10/20/78	4.00	47.5	1.8	60	61.0	6.4
10/20/78	4.58	43.0	1.4	60		
10/20/78	5.00	48.6	1.2	52	61.0	6.5
10/20/78	5.50	45.8	1.4	64		
10/20/78	6.17	38.0	1.6	50	61.0	6.6
10/20/78	6.58	30.0	0.6	80		
10/20/78	7.00	37.0	1.0	50	62.0	6.6
10/20/78	7.45	43.1	0.4	50		
10/20/78	8.00	40.2	0.4	60	63.0	6.6
10/20/78	8.50	34.6	0.2	20		
10/20/78	8.92	42.9	0.3	320	63.0	6.7
			Station EB			
			Surface			
10/19/78	9.00	3.0	0.2	340	63.0	7.9
10/19/78	9.72	3.0	0.4	332		
10/19/78	10.35	3.0	0.8	260	64.0	8.0
10/19/78	10.83	3.0	1.3	270		
10/19/78	11.32	3.0	1.1	270	65.0	8.1
10/19/78	11.82	3.0	1.4	255		
10/19/78	12.27	3.0	1.1	270	65.0	7.7
10/19/78	12.70	3.0	1.2	256		
10/19/78	13.27	3.0	1.2	262	66.0	7.4
10/19/78	13.67	3.0	1.2	250		
10/19/78	14.35	3.0	1.0	262	66.0	7.2
10/19/78	14.77	3.0	1.2	274		
10/19/78	15.27	3.0	1.2	260	65.0	6.9
10/19/78	15.80	3.0	1.4	262		
10/19/78	16.27	3.0	1.0	270	66.0	6.8
10/19/78	16.77	3.0	1.0	254		
10/19/78	17.27	3.0	1.4	260	64.0	6.5
10/19/78	17.77	3.0	1.2	260		
10/19/78	18.27	3.0	1.0	270	65.0	6.3
10/19/78	18.77	3.0	0.8	270		
10/19/78	19.27	3.0	0.6	270	63.0	6.3
10/19/78	19.77	3.0	0.6	260		
10/19/78	20.28	3.0	0.8	268	63.0	6.2
10/19/78	20.78	3.0	1.0	250		
10/19/78	21.32	3.0	0.6	268	64.0	6.2
10/19/78	21.77	3.0	0.8	250		
10/19/78	22.27	3.0	0.8	260	64.0	6.3
10/19/78	22.73	3.0	0.6	260		
10/19/78	23.30	3.0	0.4	258	64.0	6.1
10/19/78	23.93	3.0	0.4	290		
10/20/78	0.27	3.0	0.2	300	63.0	6.1
10/20/78	0.82	3.0	0.2	220		
10/20/78	1.30	3.0	0.2	120	62.0	6.0
10/20/78	1.77	3.0	0.4	60		
10/20/78	2.33	3.0	1.0	80	63.0	6.3
10/20/78	2.77	3.0	1.2	82		
10/20/78	3.33	3.0	1.2	90	62.0	6.2
10/20/78	3.70	3.0	1.4	80		
10/20/78	4.37	3.0	1.2	90	61.0	6.3
10/20/78	4.82	3.0	1.2	88		
10/20/78	5.35	3.0	1.0	86	61.0	6.5
10/20/78	5.83	3.0	1.2	84		
10/20/78	6.48	3.0	1.2	80	61.0	6.6
10/20/78	6.82	3.0	1.0	80		
10/20/78	7.30	3.0	1.0	90	62.0	6.6
10/20/78	7.72	3.0	0.8	90		
10/20/78	8.27	3.0	0.4	90	63.0	6.7
10/20/78	8.68	3.0	0.2	80		
10/20/78	9.22	3.0	0.2	154	63.0	6.7

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station EB (Continued)			
			Middepth			
10/19/78	8.97	10.3	0.3	310	63.0	8.1
10/19/78	9.67	12.9	0.7	306		
10/19/78	10.32	6.0	1.0	250	64.0	8.1
10/19/78	10.82	7.9	1.3	264		
10/19/78	11.28	8.2	1.0	264	65.0	8.3
10/19/78	11.77	6.2	1.0	262		
10/19/78	12.22	4.3	1.2	260	63.0	7.7
10/19/78	12.73	4.4	1.4	254		
10/19/78	13.22	4.6	1.2	260	66.0	7.6
10/19/78	13.65	4.4	1.0	240		
10/19/78	14.30	14.7	1.2	260	66.0	7.3
10/19/78	14.72	14.1	1.2	270		
10/19/78	15.22	14.0	1.0	264	65.0	7.0
10/19/78	15.78	13.1	1.0	270		
10/19/78	16.22	11.6	1.0	268	66.0	6.8
10/19/78	16.72	12.4	1.0	260		
10/19/78	17.22	11.9	1.0	280	64.0	6.5
10/19/78	17.72	11.0	0.8	264		
10/19/78	18.22	9.5	0.9	262	65.0	6.3
10/19/78	18.72	9.7	0.6	264		
10/19/78	19.22	8.0	0.8	254	63.0	6.4
10/19/78	19.72	9.8	1.0	244		
10/19/78	20.23	8.0	0.8	260	63.0	6.4
10/19/78	20.73	9.5	1.0	252		
10/19/78	21.27	10.6	1.0	270	64.0	6.4
10/19/78	21.72	11.1	1.0	250		
10/19/78	22.23	10.5	1.0	250	64.0	6.3
10/19/78	22.68	10.6	0.6	264		
10/19/78	23.25	10.[illegible]	0.6	260	64.0	6.1
10/19/78	23.87	12.5	0.4	250		
10/20/78	0.22	12.7	0.1	260	63.0	6.1
10/20/78	0.77	13.8	0.2	210		
10/20/78	1.25	12.4	0.4	130	62.0	6.2
10/20/78	1.72	11.8	0.6	70		
10/20/78	2.27	6.9	1.2	70	63.0	6.2
10/20/78	2.72	7.0	1.2	80		
10/20/78	3.28	6.4	1.2	84	62.0	6.2
10/20/78	3.67	7.8	1.4	78		
10/20/78	4.30	5.1	1.2	90	61.0	6.4
10/20/78	4.77	6.3	1.2	80		
10/20/78	5.30	6.0	1.0	84	61.0	6.5
10/20/78	5.78	5.1	1.2	84		
10/20/78	6.43	5.4	1.2	80	61.0	6.6
10/20/78	6.78	6.5	1.0	90		
10/20/78	7.27	9.0	1.0	84	62.0	6.6
10/20/78	7.68	5.8	0.8	90		
10/20/78	8.22	7.1	0.5	86	63.0	6.7
10/20/78	8.65	5.1	0.2	90		
10/20/78	9.15	13.1	0.2	300	63.0	6.7
			Bottom			
10/19/78	8.93	20.6	0.4	322	63.0	8.4
10/19/78	9.63	25.9	1.2	300		
10/19/78	10.25	12.0	0.8	244	64.0	8.4
10/19/78	10.80	15.8	1.1	262		
10/19/78	11.25	16.4	0.6	244	65.0	8.4
10/19/78	11.72	12.4	0.9	270		
10/19/78	12.17	9.5	0.8	260	65.0	8.1
10/19/78	12.68	8.8	0.9	270		
10/19/78	13.17	9.2	0.8	260	66.0	7.9
10/19/78	13.55	8.7	0.7	255		
10/19/78	14.25	29.5	0.8	260	66.0	7.4
10/19/78	14.67	28.2	1.0	258		
10/19/78	15.17	28.0	0.9	270	65.0	7.0
10/19/78	15.75	27.1	0.6	268		
10/19/78	16.17	23.2	1.0	270	66.0	6.8
10/19/78	16.67	24.7	0.4	294		
10/19/78	17.17	23.8	1.0	278	64.0	6.6
10/19/78	17.67	21.9	0.6	262		
10/19/78	18.17	18.9	0.8	270	65.0	6.3
10/19/78	18.67	19.3	0.6	290		
10/19/78	19.17	17.1	1.0	250	63.0	6.4
10/19/78	19.67	19.7	0.6	250		
10/19/78	20.17	16.0	1.0	250	63.0	6.4
10/19/78	20.68	18.7	1.0	250		
10/19/78	21.22	21.2	0.8	268	64.0	6.5
10/19/78	21.67	22.2	0.6	254		
10/19/78	22.18	21.0	0.4	238	64.0	6.4
10/19/78	22.63	21.1	0.4	270		
10/19/78	23.20	20.2	0.6	250	64.0	6.2
10/19/78	23.83	24.7	0.2	240		
10/20/78	0.17	23.4	0.2	250	63.0	6.1
10/20/78	0.72	27.5	0.2	150		
10/20/78	1.20	24.8	0.4	100	62.0	6.3
10/20/78	1.68	23.5	0.6	70		
10/20/78	2.22	13.8	1.0	60	63.0	6.3
10/20/78	2.67	14.0	1.0	74		
10/20/78	3.22	12.7	1.2	84	62.0	6.2
10/20/78	3.63	15.5	1.2	74		
10/20/78	4.25	10.2	1.2	80	61.0	6.5
10/20/78	4.73	13.5	1.0	80		
10/20/78	5.27	12.0	0.8	90	61.0	6.5
10/20/78	5.73	10.2	1.2	82		
10/20/78	6.37	10.6	1.0	90	61.0	6.6
10/20/78	6.73	13.0	1.0	90		

(Continued)

Table II (Continued)

Time						
Date	Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station EB (Continued)			
			Bottom (Continued)			
10/20/78	7.22	18.0	1.0	84	62.0	6.7
10/20/78	7.65	11.5	0.6	90		
10/20/78	8.17	14.2	0.5	92	63.0	6.6
10/20/78	8.62	10.2	0.4	82		
10/20/78	9.12	26.2	0.2	300	63.0	6.7
			Station FA			
			Surface			
10/19/78	8.18	3.0	0.8	300	63.0	7.2
10/19/78	8.57	3.0	1.4	284		
10/19/78	9.05	3.0	1.8	295	--	8.1
10/19/78	9.60	3.0	1.9	296		
10/19/78	10.07	3.0	2.4	286	63.0	8.9
10/19/78	10.57	3.0	2.7	290		
10/19/78	11.07	3.0	3.0	290	--	9.8
10/19/78	11.55	3.0	3.2	290		
10/19/78	12.07	3.0	3.8	286	64.0	8.7
10/19/78	12.53	3.0	3.8	280		
10/19/78	13.05	3.0	3.8	290	--	8.5
10/19/78	13.57	3.0	3.4	288		
10/19/78	14.07	3.0	3.5	288	64.0	8.8
10/19/78	14.53	3.0	3.4	284		
10/19/78	15.05	3.0	3.6	250	--	8.5
10/19/78	15.53	3.0	3.8	286		
10/19/78	16.05	3.0	3.3	290	64.0	8.0
10/19/78	16.53	3.0	3.2	288		
10/19/78	17.05	3.0	3.0	290	--	7.7
10/19/78	17.53	3.0	3.1	29[illegible]		
10/19/78	18.05	3.0	3.0	29[illegible]	63.0	7.5
10/19/78	18.53	3.0	2.6	290		
10/19/78	19.07	3.0	2.4	292	--	7.4
10/19/78	19.53	3.0	2.2	290		
10/19/78	20.07	3.0	2.0	290	63.0	7.1
10/19/78	20.55	3.0	1.9	290		
10/19/78	21.07	3.0	2.0	290	--	7.0
10/19/78	21.57	3.0	1.2	286		
10/19/78	22.05	3.0	1.2	290	62.0	6.9
10/19/78	22.57	3.0	1.0	288		
10/19/78	23.07	3.0	0.7	296	--	6.8
10/19/78	23.57	3.0	0.4	290		
10/20/78	0.05	3.0	0.2	240	63.0	6.8
10/20/78	0.57	3.0	0.2	72		
10/20/78	1.05	3.0	0.4	96	--	6.8
10/20/78	1.70	3.0	0.6	100		
10/20/78	2.05	3.0	1.0	96	62.0	6.9
10/20/78	2.57	3.0	1.4	110		
10/20/78	3.05	3.0	1.6	100	--	7.2
10/20/78	3.52	3.0	1.9	108		
10/20/78	4.07	3.0	1.6	100	62.0	7.3
10/20/78	4.73	3.0	1.4	94		
10/20/78	5.05	3.0	1.4	80	--	7.3
10/20/78	5.70	3.0	1.5	90		
10/20/78	6.05	3.0	1.2	90	63.0	7.7
10/20/78	6.63	3.0	1.2	96		
10/20/78	7.05	3.0	1.0	100	--	7.8
10/20/78	7.53	3.0	1.0	60		
10/20/78	8.07	3.0	0.6	48	60.0	7.6
10/20/78	8.53	3.0	0.3	66		
10/20/78	9.03	3.0	0.4	334	--	7.6
			Middepth			
10/19/78	8.13	15.0	0.2	30	63.0	11.8
10/19/78	8.53	16.0	1.2	280		
10/19/78	9.03	15.0	1.3	290	--	10.9
10/19/78	9.57	15.0	1.4	294		
[illegible]	10.05	15.7	1.9	294	63.0	11.9
[illegible]	10.53	15.0	1.9	290		
[illegible]	11.05	14.7	2.3	298	--	10.8
[illegible]	11.53	14.5	2.4	290		
[illegible]	12.05	14.4	2.8	290	64.0	9.9
[illegible]	12.52	14.0	3.0	290		
[illegible]	13.03	13.7	2.1	290	--	9.2
[illegible]	[illegible]	14.0	3.0	280		
[illegible]	[illegible]	13.8	3.0	290	64.0	8.9
[illegible]	[illegible]	14.5	3.3	286		
[illegible]	[illegible]	14.0	2.8	286	--	8.6
[illegible]	[illegible]	13.6	3.0	290		
[illegible]	[illegible]	14.0	2.6	290	64.0	8.1
[illegible]	[illegible]	14.0	2.6	288		
[illegible]	[illegible]	14.1	2.7	288	--	7.7
[illegible]	[illegible]	[illegible]	2.7	290		
[illegible]	[illegible]	[illegible]	2.6	290	63.0	7.5
[illegible]	[illegible]	[illegible]	2.2	294		
[illegible]	[illegible]	[illegible]	2.0	290	--	7.3
[illegible]	[illegible]	[illegible]	1.8	286		
[illegible]	[illegible]	[illegible]	2.0	290	63.0	7.1
[illegible]	[illegible]	[illegible]	1.3	290		
[illegible]	[illegible]	[illegible]	1.2	300	--	7.0
[illegible]	[illegible]	[illegible]	1.2	286		
[illegible]	[illegible]	[illegible]	1.2	290	62.0	6.9
[illegible]	[illegible]	[illegible]	0.8	290		

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station FA (Continued)			
			Middepth (Continued)			
10/19/78	23.03	15.0	0.4	290	--	6.9
10/19/78	23.55	15.0	0.2	290		
10/20/78	0.02	14.5	0.2	270	63.0	6.8
10/20/78	0.55	13.9	0.2	104		
10/20/78	1.03	14.0	0.5	120	--	6.8
10/20/78	1.68	14.0	0.8	100		
10/20/78	2.02	14.8	1.1	110	62.0	7.0
10/20/78	2.55	14.3	1.4	114		
10/20/78	3.03	14.0	1.6	110	--	7.4
10/20/78	4.03	14.5	1.8	110	62.0	7.8
10/20/78	4.55	15.2	1.8	108		
10/20/78	5.02	14.0	1.2	90	--	7.8
10/20/78	5.68	15.0	1.5	92		
10/20/78	6.02	14.0	1.2	90	63.0	8.3
10/20/78	6.62	14.5	1.0	90		
10/20/78	7.03	14.5	0.8	90	--	8.8
10/20/78	7.52	14.7	0.7	102		
10/20/78	8.03	14.0	0.5	50	60.0	7.7
10/20/78	8.52	14.0	0.3	96		
10/20/78	9.02	14.5	0.3	340	--	9.1
			Bottom			
10/19/78	8.08	31.0	0.2	20	63.0	12.3
10/19/78	8.50	31.0	0.4	304		
10/19/78	9.00	31.0	0.7	310	--	12.3
10/19/78	9.53	30.0	0.9	292		
10/19/78	10.00	31.3	1.0	310	63.0	12.1
10/19/78	10.50	30.0	0.8	300		
10/19/78	11.00	29.5	2.1	308	--	11.3
10/19/78	11.50	29.0	2.1	300		
10/19/78	12.00	28.8	1.8	290	64.0	10.3
10/19/78	12.50	28.0	2.3	290		
10/19/78	13.00	27.3	2.2	300	--	9.1
10/19/78	13.53	28.0	2.2	280		
10/19/78	14.00	27.6	2.1	290	64.0	8.8
10/19/78	14.50	29.0	1.6	300		
10/19/78	15.00	28.0	2.2	286	--	8.6
10/19/78	15.50	27.2	2.0	284		
10/19/78	16.00	28.0	2.0	310	64.0	8.2
10/19/78	16.50	28.0	1.7	300		
10/19/78	17.00	28.2	2.1	290	--	7.9
10/19/78	17.50	28.0	2.1	290		
10/19/78	18.00	28.0	1.5	280	63.0	7.5
10/19/78	18.50	28.6	2.4	286		
10/19/78	19.00	28.0	2.0	280	--	7.3
10/19/78	19.50	29.0	1.2	294		
10/19/78	20.00	29.0	1.6	300	63.0	7.1
10/19/78	20.50	29.5	1.1	310		
10/19/78	21.00	28.0	0.8	296	--	7.1
10/19/78	21.53	28.9	0.4	290		
10/19/78	22.00	29.7	0.9	300	62.0	6.9
10/19/78	22.53	29.0	0.5	300		
10/19/78	23.00	30.0	0.2	310	--	6.9
10/19/78	23.53	30.0	0.2	320		
10/20/78	24.00	29.0	0.2	110	63.0	6.8
10/20/78	0.53	27.8	0.4	120		
10/20/78	1.00	28.1	0.3	120	--	6.9
10/20/78	1.67	28.0	0.7	98		
10/20/78	2.00	29.5	0.8	110	62.0	7.1
10/20/78	2.53	28.7	1.0	110		
10/20/78	3.00	28.0	1.2	110	--	7.5
10/20/78	3.50	27.2	1.2	100		
10/20/78	4.00	29.0	0.6	114	62.0	8.1
10/20/78	4.53	30.5	0.8	114		
10/20/78	5.00	28.0	1.0	90	--	8.2
10/20/78	5.67	30.0	1.1	90		
10/20/78	6.00	28.0	1.0	96	63.0	8.1
10/20/78	6.60	29.0	0.5	70		
10/20/78	7.00	29.0	0.6	104	--	8.4
10/20/78	7.50	29.3	0.8	120		
10/20/78	8.00	27.0	0.5	96	60.0	8.4
10/20/78	8.50	28.0	0.4	260		
10/20/78	9.00	27.0	0.4	20	--	9.1
			Station FB			
			Surface			
10/19/78	8.32	3.0	1.0	266	63.0	7.9
10/19/78	8.68	3.0	1.0	280		
10/19/78	9.17	3.0	1.4	285	--	8.0
10/19/78	9.70	3.0	1.8	290		
10/19/78	10.17	3.0	2.2	292	63.0	7.0
10/19/78	10.67	3.0	2.2	300		
10/19/78	11.17	3.0	2.1	298	--	6.6
10/19/78	11.63	3.0	1.6	290		
10/19/78	12.17	3.0	2.5	220	64.0	7.0
10/19/78	12.62	3.0	2.7	282		
10/19/78	13.17	3.0	2.4	290	--	8.0
10/19/78	13.65	3.0	2.9	280		
10/19/78	14.17	3.0	2.8	290	64.0	7.9
10/19/78	14.65	3.0	3.0	286		

(Continued)

Table 11 (Continued)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
Station FB (Continued)						
Surface (Continued)						
10/19/78	15.17	3.0	3.0	290	--	8.4
10/19/78	15.63	3.0	2.8	288		
10/19/78	16.18	3.0	2.9	292	64.0	7.9
10/19/78	16.65	3.0	2.8	290		
10/19/78	17.18	3.0	2.8	292	--	7.7
10/19/78	17.63	3.0	2.8	290		
10/19/78	18.15	3.0	2.5	290	63.0	7.5
10/19/78	18.63	3.0	2.4	290		
10/19/78	19.17	3.0	2.0	294	--	7.2
10/19/78	19.63	3.0	2.1	290		
10/19/78	20.27	3.0	1.8	282	63.0	7.1
10/19/78	20.63	3.0	1.7	290		
10/19/78	21.20	3.0	1.4	286	--	7.0
10/19/78	21.67	3.0	1.2	282		
10/19/78	22.20	3.0	0.9	270	62.0	6.9
10/19/78	22.67	3.0	0.8	276		
10/19/78	23.22	3.0	0.5	270	--	6.8
10/19/78	23.67	3.0	0.3	230		
10/20/78	0.08	3.0	0.4	190	63.0	6.9
10/20/78	0.67	3.0	0.3	96		
10/20/78	1.20	3.0	0.3	90	--	6.9
10/20/78	1.80	3.0	0.9	90		
10/20/78	2.20	3.0	1.2	90	62.0	6.9
10/20/78	2.65	3.0	1.8	92		
10/20/78	3.28	3.0	2.0	104	--	7.1
10/20/78	3.63	3.0	2.0	90		
10/20/78	4.32	3.0	1.7	100	62.0	7.6
10/20/78	4.67	3.0	1.5	78		
10/20/78	5.22	3.0	1.7	86	--	7.3
10/20/78	5.80	3.0	1.4	80		
10/20/78	6.15	3.0	1.4	88	63.0	7.4
10/20/78	6.73	3.0	1.4	80		
10/20/78	7.17	3.0	1.4	84	--	7.2
10/20/78	7.60	3.0	1.1	66		
10/20/78	8.15	3.0	0.8	120	60.0	7.7
10/20/78	8.63	3.0	0.4	130		
10/20/78	9.17	3.0	0.4	190	--	8.0
Middepth						
10/19/78	8.30	19.0	0.5	250	63.0	11.2
10/19/78	8.65	18.0	0.8	262		
10/19/78	9.13	18.0	1.6	285	--	12.1
10/19/78	9.67	18.0	1.8	284		
10/19/78	10.15	18.6	2.0	286	63.0	11.5
10/19/78	10.63	18.5	2.0	280		
10/19/78	11.15	18.8	2.1	286	--	11.5
10/19/78	11.62	18.7	2.2	280		
10/19/78	12.15	18.7	2.3	216	64.0	11.0
10/19/78	12.60	18.9	2.3	282		
10/19/78	13.15	19.3	2.4	272	--	10.0
10/19/78	13.63	18.8	2.7	280		
10/19/78	14.15	19.0	2.5	284	64.0	9.0
10/19/78	14.62	18.8	2.3	286		
10/19/78	15.15	18.5	2.8	290	--	8.6
10/19/78	15.62	18.8	2.3	284		
10/19/78	16.17	18.6	2.4	288	64.0	8.1
10/19/78	16.63	18.8	2.5	286		
10/19/78	17.17	19.0	2.5	288	--	7.7
10/19/78	17.62	18.6	2.4	286		
10/19/78	18.13	18.7	2.4	286	63.0	7.5
10/19/78	18.62	18.9	2.1	280		
10/19/78	19.15	19.0	2.0	284	--	7.3
10/19/78	19.62	18.8	2.0	280		
10/19/78	20.23	18.7	1.7	280	63.0	7.2
10/19/78	20.62	18.8	1.3	280		
10/19/78	21.18	18.8	0.9	282	--	7.0
10/19/78	21.65	18.8	1.2	276		
10/19/78	22.17	19.0	0.9	290	62.0	6.9
10/19/78	22.65	19.0	0.5	280		
10/19/78	23.20	19.0	0.2	270	--	7.0
10/19/78	23.65	18.7	0.2	200		
10/20/78	0.15	19.0	0.4	210	63.0	6.9
10/20/78	0.65	18.9	0.4	72		
10/20/78	1.18	19.0	0.2	120	--	6.9
10/20/78	1.78	18.9	0.7	100		
10/20/78	2.17	18.3	1.3	108	62.0	7.2
10/20/78	2.63	18.5	1.4	92		
10/20/78	3.25	18.7	1.7	100	--	7.5
10/20/78	3.62	18.6	2.0	102		
10/20/78	4.25	19.0	2.0	110	62.0	7.5
10/20/78	4.65	18.6	2.0	80		
10/20/78	5.18	19.0	1.5	80	--	7.8
10/20/78	5.78	18.5	1.2	82		
10/20/78	6.13	18.7	1.0	82	63.0	8.2
10/20/78	6.70	18.5	1.2	70		
10/20/78	7.13	18.5	1.2	110	--	8.6
10/20/78	7.58	18.3	0.5	60		
10/20/78	8.12	18.5	0.4	120	60.0	8.7
10/20/78	8.62	18.5	0.4	220		
10/20/78	9.15	18.7	0.2	216	--	8.7

(Continued)

Table 11 (Concluded)

Date	Time Decimal Hours	Depth, ft	Speed, fps	Magnetic Direction, deg	Temperature, °F	Salinity, ppt
			Station FB (Continued)			
			Bottom			
10/19/78	8.25	38.0	0.2	250	63.0	12.6
10/19/78	8.62	37.0	0.6	280		
10/19/78	9.07	37.0	0.6	290	--	12.7
10/19/78	9.63	37.0	1.0	284		
10/19/78	10.12	37.2	1.2	290	63.0	12.1
10/19/78	10.60	37.0	1.4	310		
10/19/78	11.13	37.6	1.6	282	--	11.6
10/19/78	11.60	37.4	1.1	264		
10/19/78	12.13	38.4	1.7	240	64.0	11.1
10/19/78	12.58	37.8	1.6	270		
10/19/78	13.12	38.6	1.2	286	--	10.6
10/19/78	13.62	37.5	1.2	280		
10/19/78	14.13	38.0	1.7	270	64.0	9.5
10/19/78	14.60	37.5	2.0	280		
10/19/78	15.12	37.0	2.1	282	--	8.5
10/19/78	15.60	37.5	1.7	274		
10/19/78	16.13	37.2	1.8	278	64.0	8.2
10/19/78	16.62	37.6	1.8	276		
10/19/78	17.13	38.0	1.7	280	--	7.7
10/19/78	17.60	37.2	1.9	276		
10/19/78	18.10	37.4	1.7	277	63.0	7.5
10/19/78	18.60	37.8	1.6	270		
10/19/78	19.12	38.0	2.5	270	--	7.3
10/19/78	19.60	37.5	1.4	270		
10/19/78	20.20	37.5	1.0	276	63.0	7.1
10/19/78	20.60	37.7	0.8	280		
10/19/78	21.17	37.7	0.7	284	--	7.0
10/19/78	21.63	37.6	0.6	276		
10/19/78	22.13	38.0	0.6	310	62.0	7.0
10/19/78	22.63	38.0	0.3	290		
10/19/78	23.18	38.0	0.2	296	--	7.0
10/19/78	23.63	37.5	0.2	120		
10/20/78	0.12	38.0	0.4	270	63.0	7.0
10/20/78	0.63	37.8	0.3	350		
10/20/78	1.17	38.0	0.2	170	--	7.0
10/20/78	1.77	37.7	0.4	116		
10/20/78	2.13	37.6	1.2	118	62.0	7.3
10/20/78	2.62	37.0	1.0	92		
10/20/78	3.22	37.5	1.6	108	--	8.2
10/20/78	3.60	37.2	1.0	92		
10/20/78	4.22	38.0	1.0	110	62.0	8.2
10/20/78	4.63	37.2	1.0	60		
10/20/78	5.28	38.0	1.0	20	--	8.5
10/20/78	5.77	37.1	1.0	96		
10/20/78	6.12	37.4	1.1	80	63.0	8.9
10/20/78	6.67	37.0	0.7	40		
10/20/78	7.10	37.0	0.6	100	--	8.9
10/20/78	7.57	36.6	0.5	48		
10/20/78	8.08	37.0	0.4	120	60.0	9.4
10/20/78	8.60	37.0	0.6	160		
10/20/78	9.13	37.5	0.2	240	--	9.2

Table 12

Constituent Amplitude of Tidal Currents

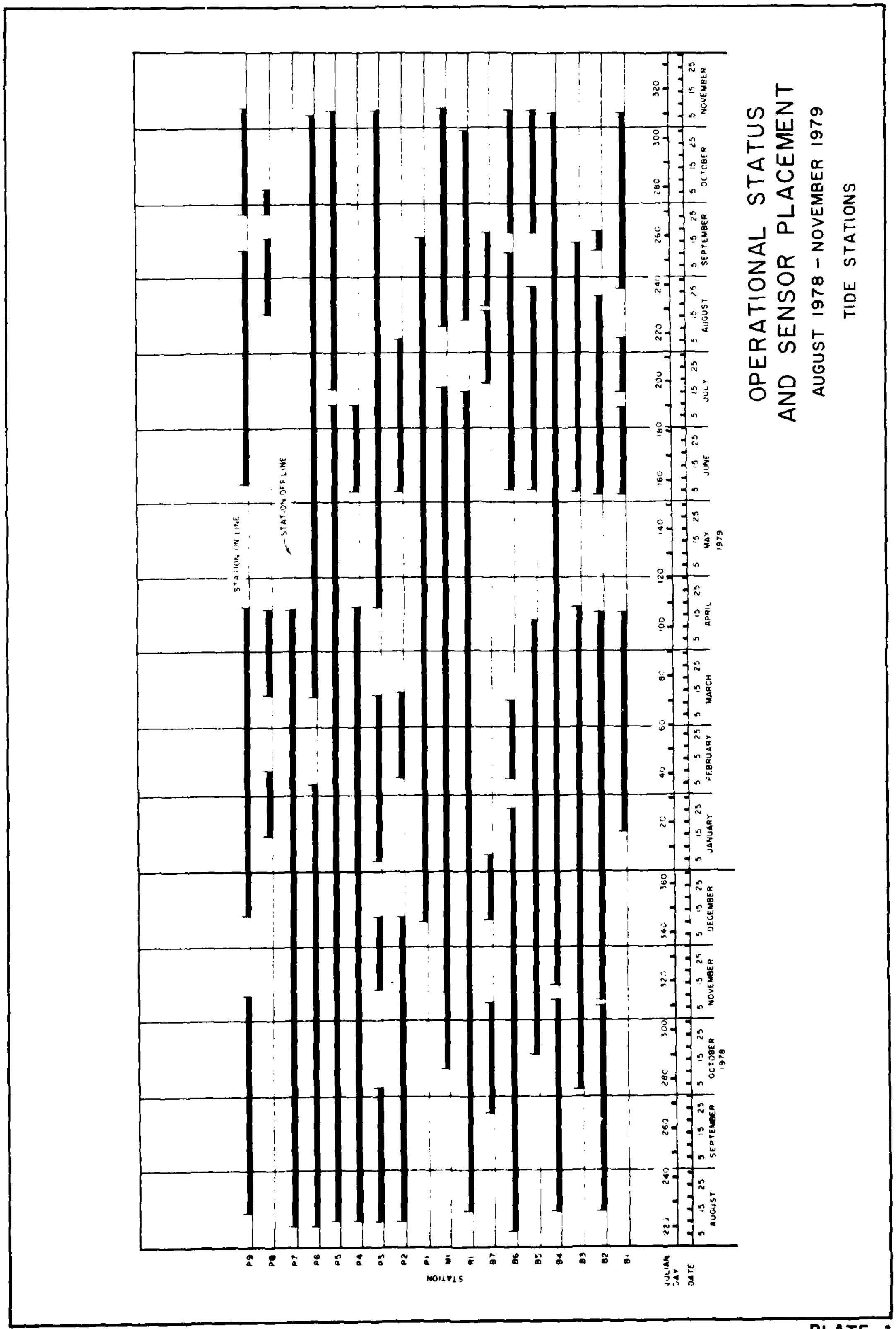
Current Gage	Record Length days	Constituent Amplitude, fps O1	K1*	Q1	M1	J1	M2	S2	N2	M4	M6	M8	Residual rms, fps	Mean Velocity fps
V1	32	0.51	0.60	0.06	0.14	0.06	0.22	0.18	0.05	0.02	0.01	0.01	0.28	-0.11
V2	32	0.20	0.65	0.10	0.09	0.05	0.13	0.17	0.08	0.06	0.01	0.02	0.46	-0.12
V3	27	0.19	0.19	0.17	0.04	0.10	0.06	0.18	0.10	0.04	0.01	0.01	0.30	0.02
V4	27	0.40	0.29	0.07	0.09	0.05	0.19	0.21	0.11	0.07	0.02	0.01	0.33	-0.12
V5	32	0.14	0.09	0.01	0.05	0.03	0.05	0.08	0.02	0.01	--	--	0.14	-0.16
V6	35	0.58	0.52	0.13	0.13	0.07	0.22	0.17	0.07	0.01	0.02	0.01	0.34	-0.02
V8-S	32	0.46	0.45	0.12	0.11	0.06	0.10	0.13	0.03	0.01	0.01	0.01	0.25	0.08
V10-S	25	0.77	0.64	0.20	0.20	0.08	0.16	0.12	0.08	0.01	0.01	0.01	0.34	-0.34
V11-S	32	0.56	0.47	0.16	0.17	0.10	0.07	0.16	0.06	0.01	--	--	0.24	0.18
V11-M	32	0.52	0.42	0.16	0.15	0.11	0.06	0.14	0.05	--	0.01	--	0.24	0.17
V11-B	32	0.53	0.44	0.13	0.17	0.10	0.09	0.15	0.05	0.01	0.01	0.01	0.24	0.18
V12-S	32	1.10	0.88	0.27	0.30	0.18	0.14	0.20	0.09	0.02	0.01	0.01	0.38	-0.07
V12-M	32	1.07	0.95	0.26	0.34	0.23	0.16	0.19	0.08	0.02	0.01	0.01	0.39	-0.07
V12-B	32	0.68	0.57	0.19	0.22	0.11	0.10	0.11	0.05	0.03	0.01	0.01	0.30	-0.08
V13	35	0.34	0.30	0.11	0.12	0.07	0.09	0.14	0.05	0.01	0.01	0.01	0.24	-0.11
V21-S	15	0.87	0.63	0.12	0.35	0.28	0.05	0.14	0.06	0.01	--	0.01	0.28	0.11

* Because of the shortness of the data records, some energy from the P1 constituent is included in the K1 constituent.

Table 13

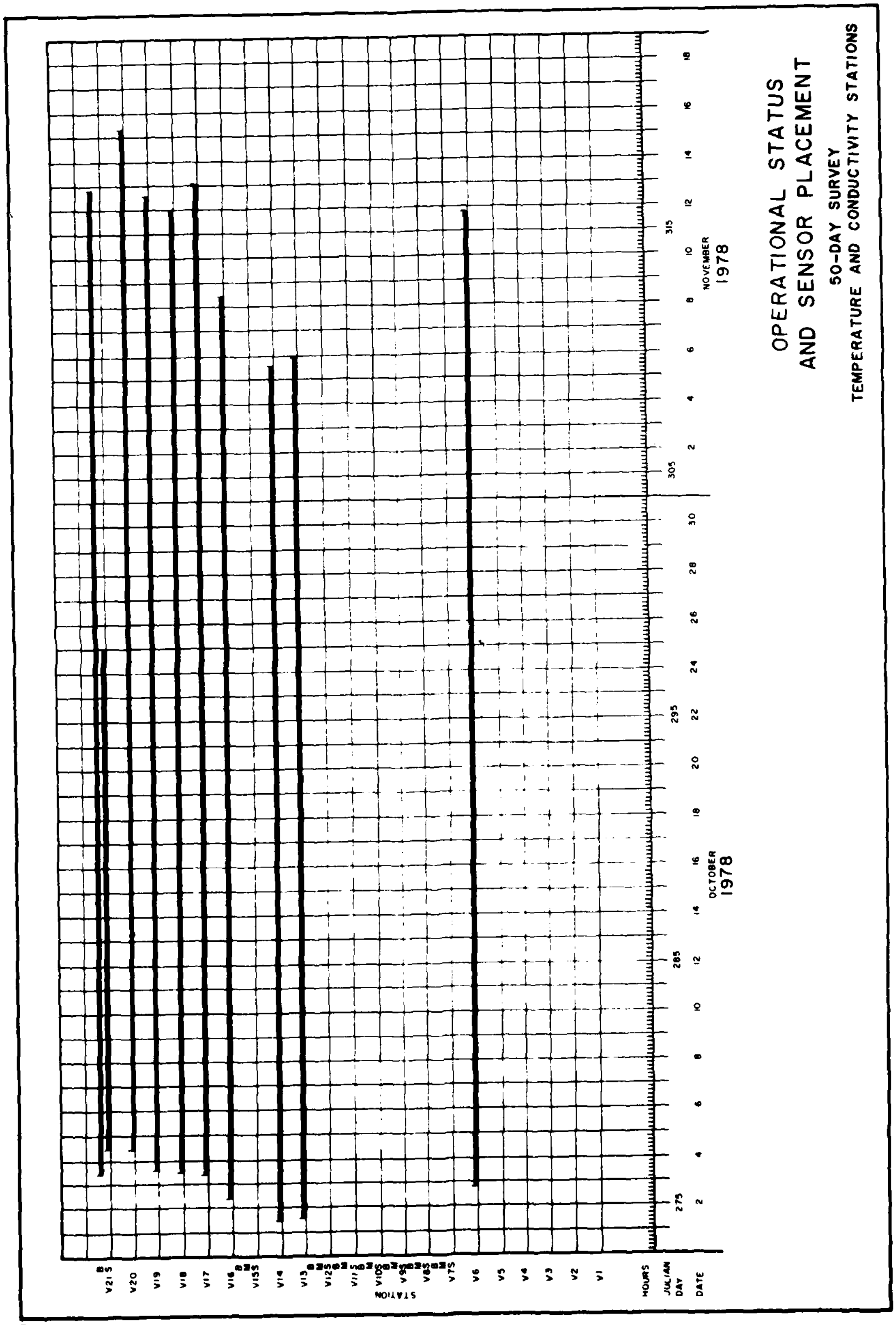
Local Epoch of Tidal Currents

Current Gage	Local Epoch, deg										
	O1	K1	Q1	M1	J1	M2	S2	N2	M4	M6	M8
V1	329.1	328.1	334.0	106.5	136.5	108.2	67.6	173.6	153.0	301.8	160.9
V2	262.0	259.4	191.0	87.7	57.7	72.7	278.8	79.8	302.6	98.4	23.2
V3	57.6	179.2	107.6	248.6	183.2	224.7	119.7	237.1	32.7	329.7	48.2
V4	322.5	4.0	70.0	98.8	146.5	107.8	100.9	177.5	81.6	187.7	17.7
V5	294.1	253.4	194.9	132.6	212.6	184.2	130.9	221.4	198.9	--	--
V6	338.8	342.9	350.3	78.1	356.5	280.6	261.0	324.4	278.8	130.4	300.4
V8-S	10.9	33.8	53.0	153.9	154.8	184.1	160.3	229.9	92.1	11.1	354.3
V10-S	29.7	37.9	111.3	134.1	313.4	247.1	214.7	277.6	243.8	130.8	33.6
V11-S	5.2	24.1	35.7	153.9	151.5	132.6	135.4	177.0	122.0	--	--
V11-M	18.0	39.7	47.1	164.9	150.2	149.2	164.2	205.0	--	220.0	--
V11-B	1.6	20.5	31.5	148.0	128.1	115.7	129.8	174.7	3.0	245.6	106.8
V12-S	10.3	27.7	52.5	167.7	151.4	172.1	143.1	209.9	53.4	89.5	183.8
V12-M	353.7	7.4	28.3	144.7	140.5	138.0	108.5	203.8	358.3	334.2	352.5
V12-B	4.8	20.9	32.8	152.5	125.7	177.4	137.2	243.8	47.9	227.7	254.7
V13	277.5	259.0	285.4	58.1	75.5	262.2	275.0	4.1	44.4	88.4	184.5
V21-S	267.5	256.6	283.8	341.0	36.1	42.9	51.9	92.5	63.8	--	251.3



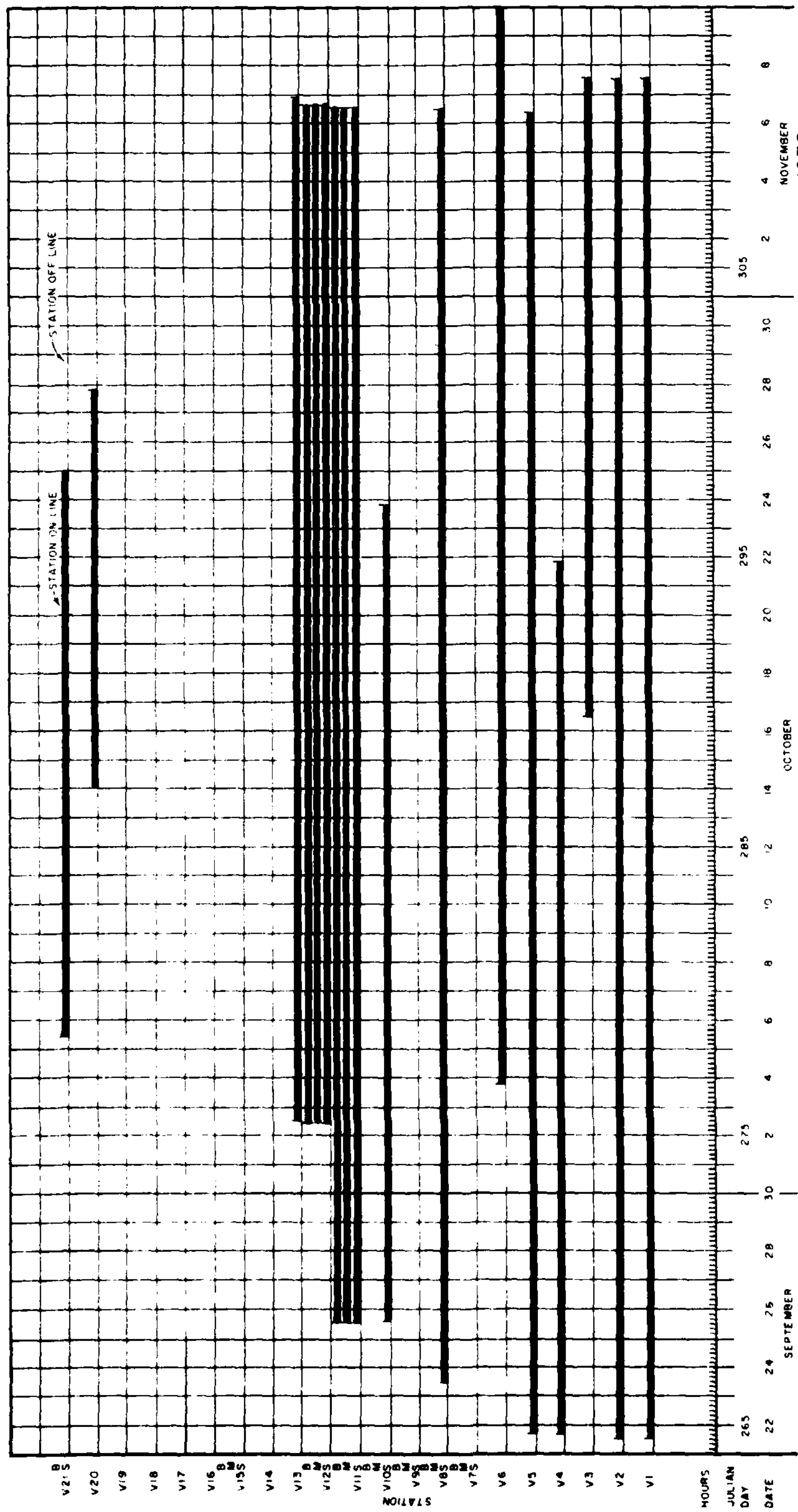
OPERATIONAL STATUS
AND SENSOR PLACEMENT
AUGUST 1978 - NOVEMBER 1979
TIDE STATIONS
STATION ON LINE
STATION OFF LINE
STATION
P9
P8
P7
P6
P5
P4
P3
P2
P1
M1
R1
B7
B6
B5
B4
B3
B2
B1
JULIAN DAY
DATE
AUGUST
SEPTEMBER
OCTOBER 1978
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY 1979
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER

PLATE 1



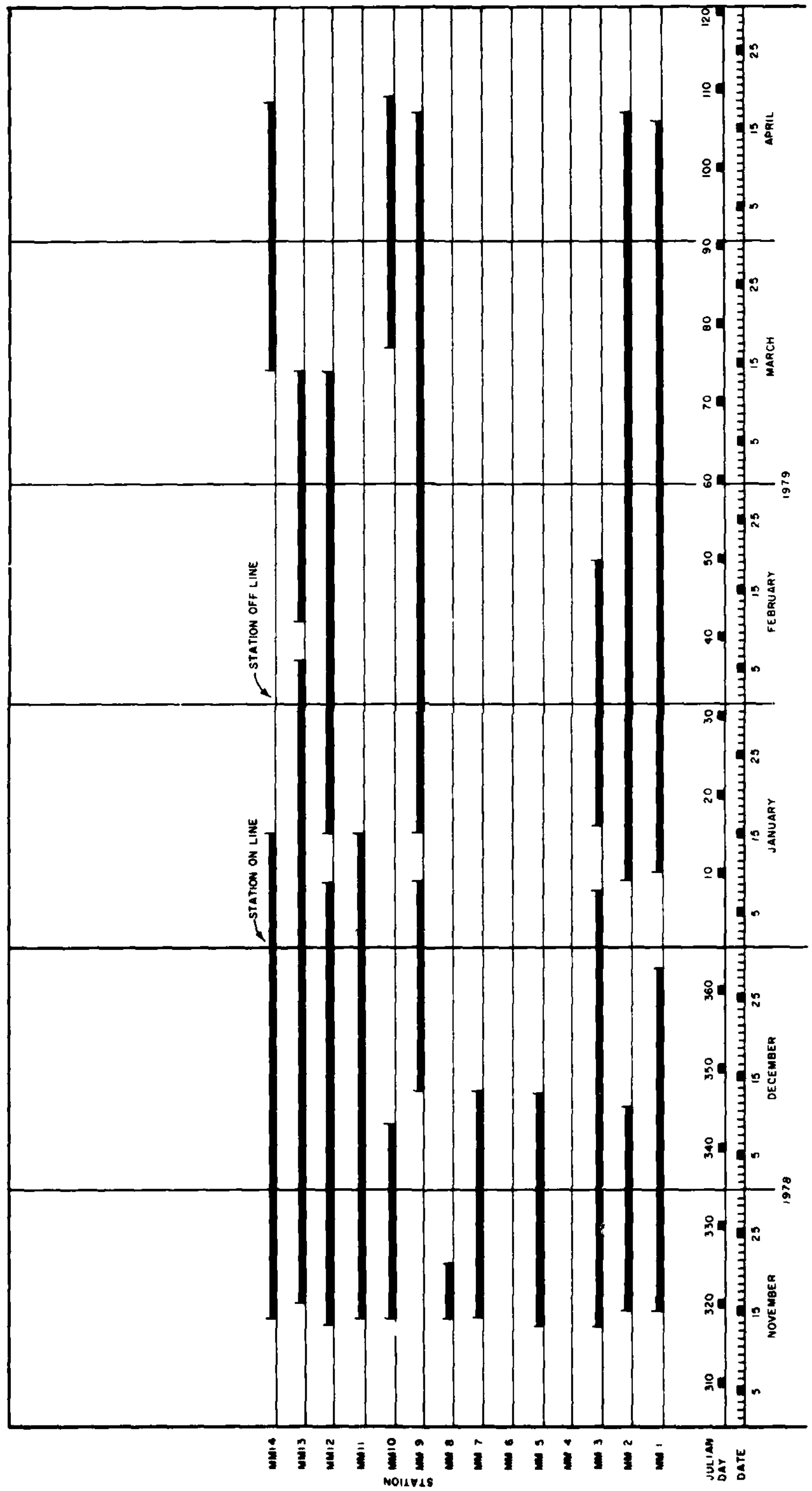
OPERATIONAL STATUS
AND SENSOR PLACEMENT
50-DAY SURVEY
TEMPERATURE AND CONDUCTIVITY STATIONS
NOVEMBER
1978
OCTOBER
1978
STATION
HOURS
JULIAN DAY
DATE
V21
V20
V19
V18
V17
V16
V15
V14
V13
V12
V11
V10
V9
V8
V7
V6
V5
V4
V3
V2
V1
275
285
295
305
315

PLATE 2



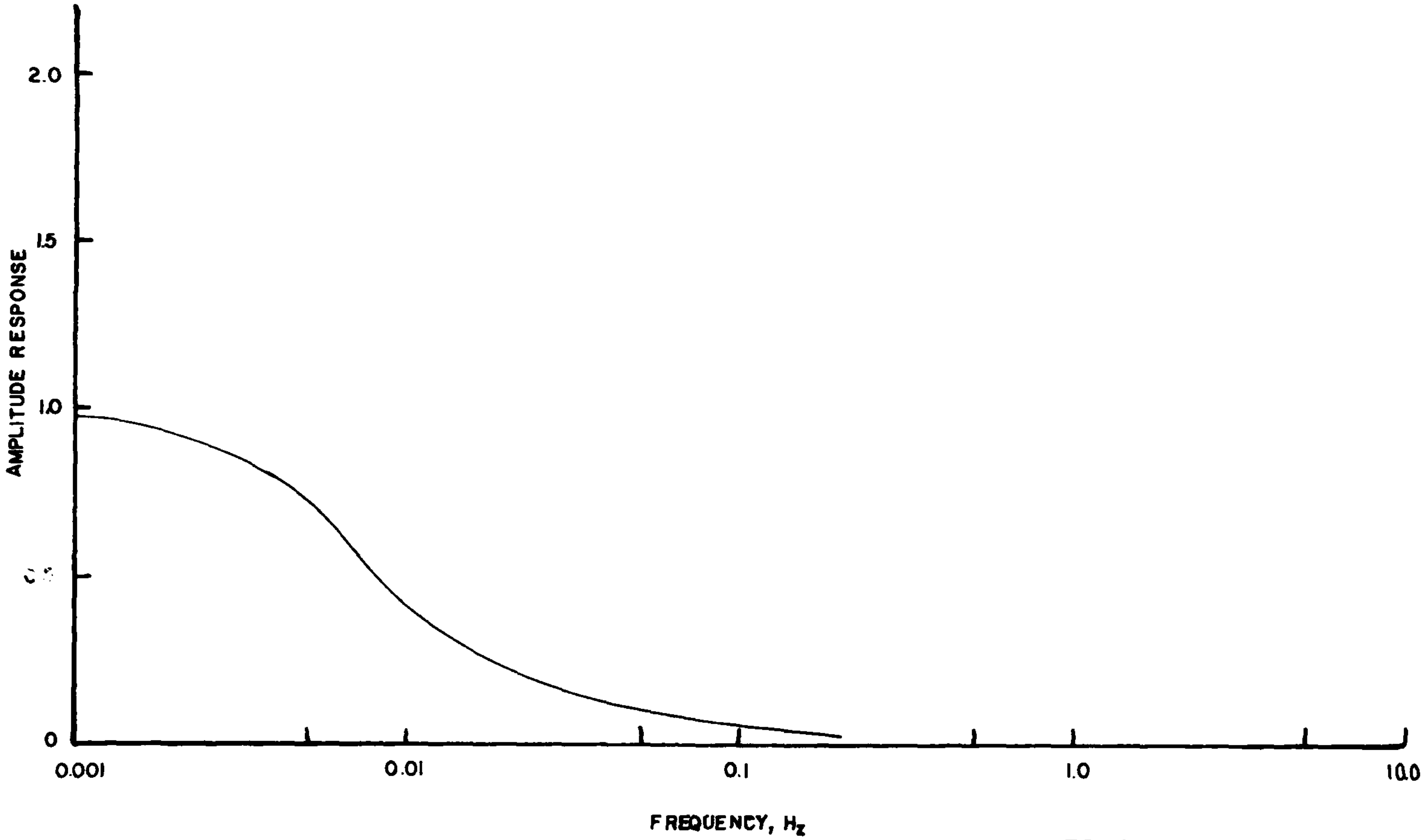
OPERATIONAL STATUS
AND SENSOR PLACEMENT
50-DAY SURVEY
VELOCITY METER STATIONS

PLATE 3

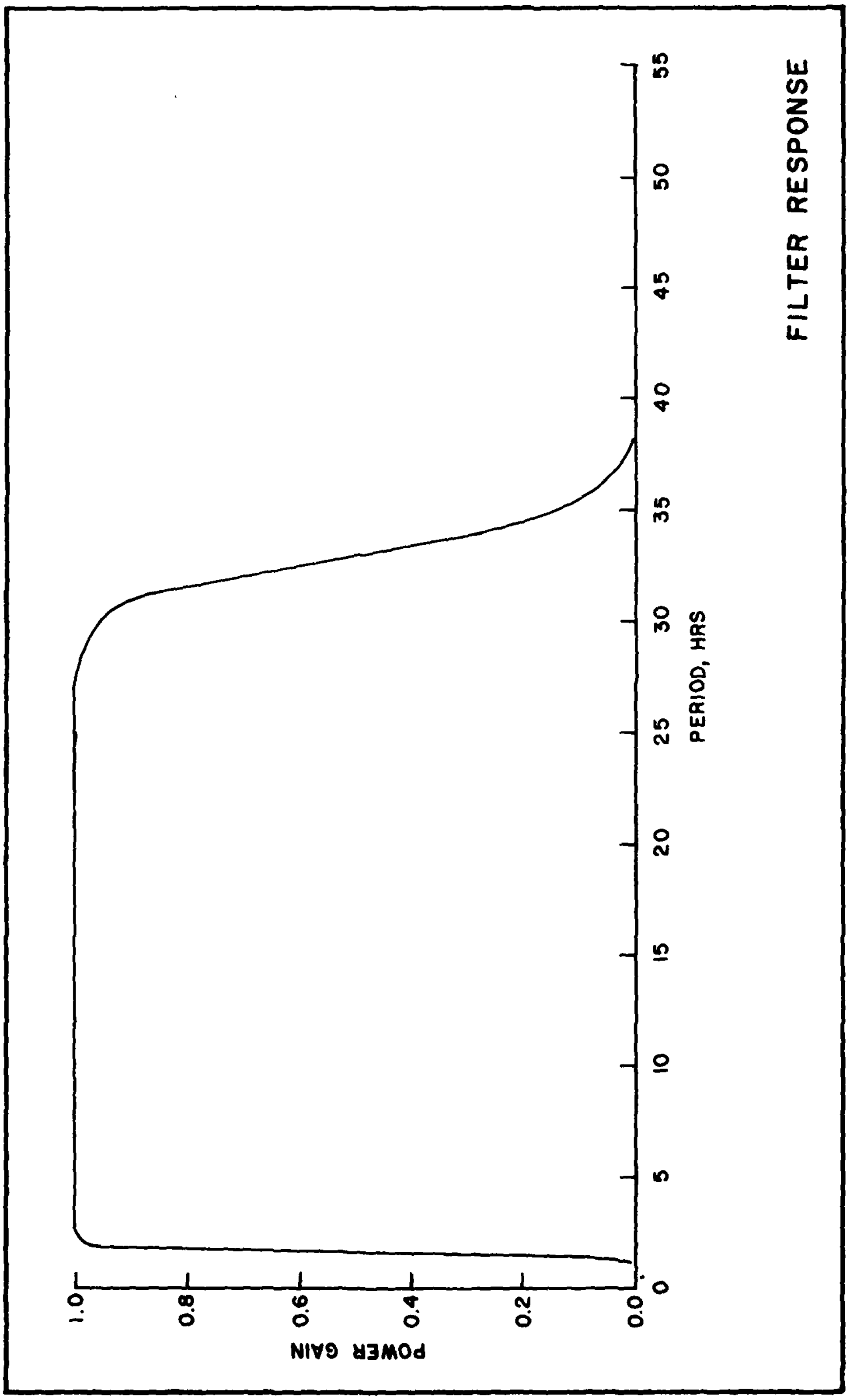


OPERATIONAL STATUS
AND SENSOR PLACEMENT
NOVEMBER 1978 – APRIL 1979
WATER QUALITY STATIONS

PLATE 4

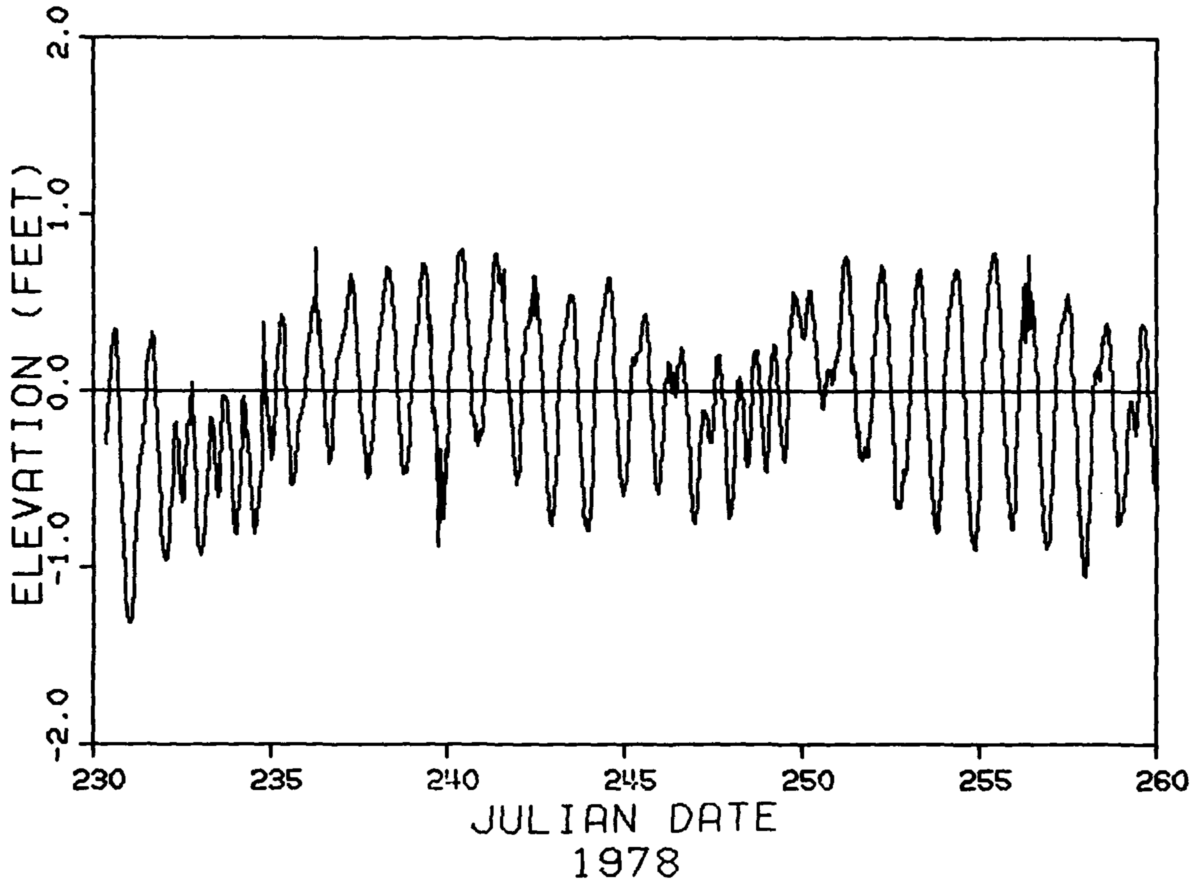


TIDE GAGE
STILLING WELL RESPONSE



FILTER RESPONSE
PERIOD, HRS
POWER GAIN
0 5 10 15 20 25 30 35 40 45 50 55
0.0 0.2 0.4 0.6 0.8 1.0

PLATE 6

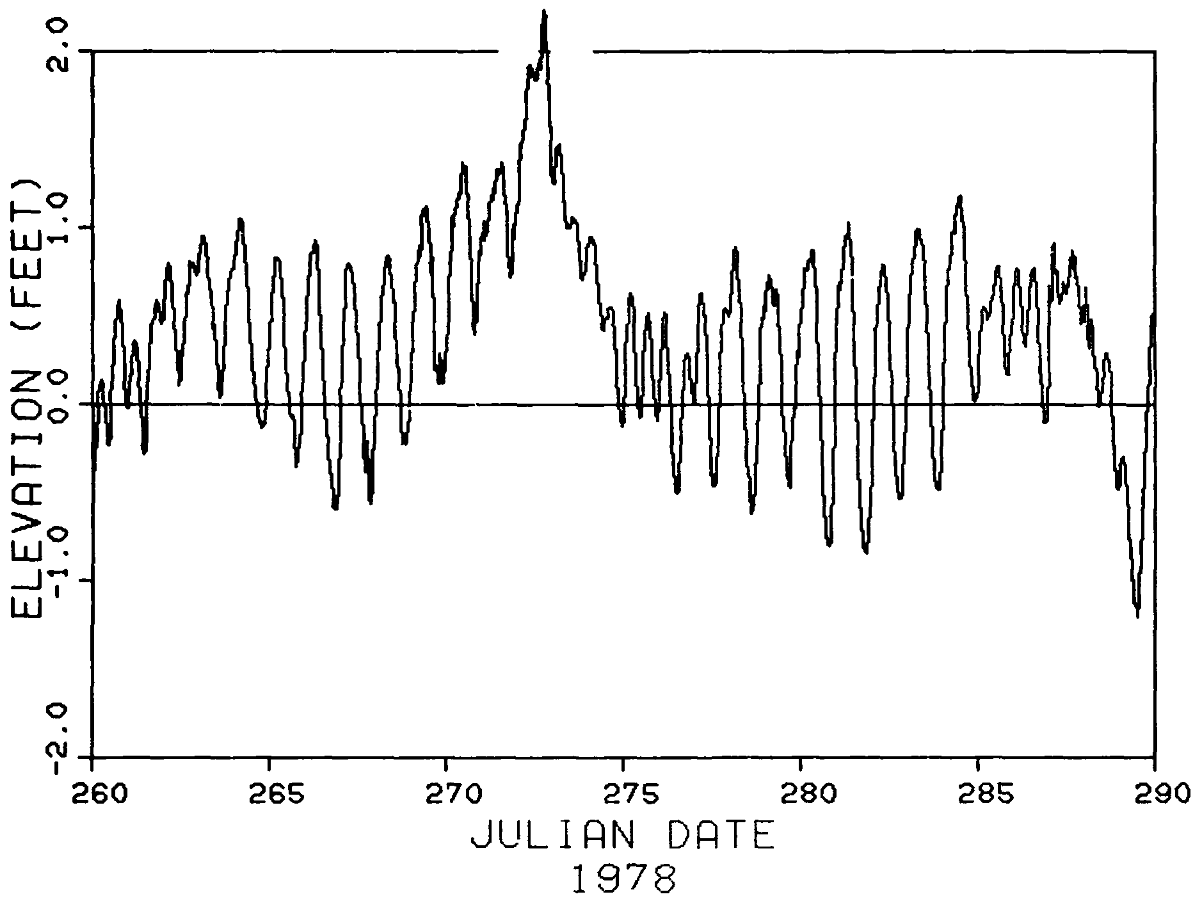


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE B-6

DAY 230 TO DAY 260 1978

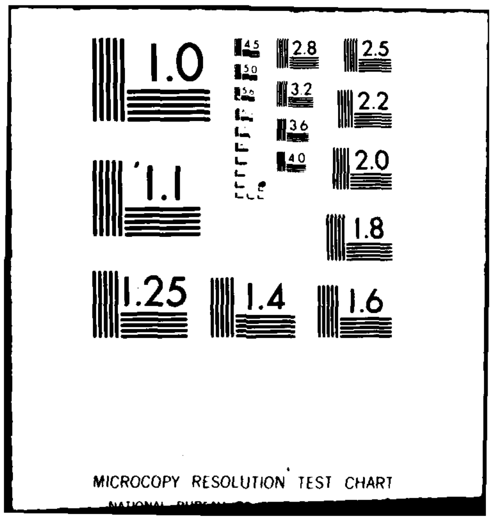


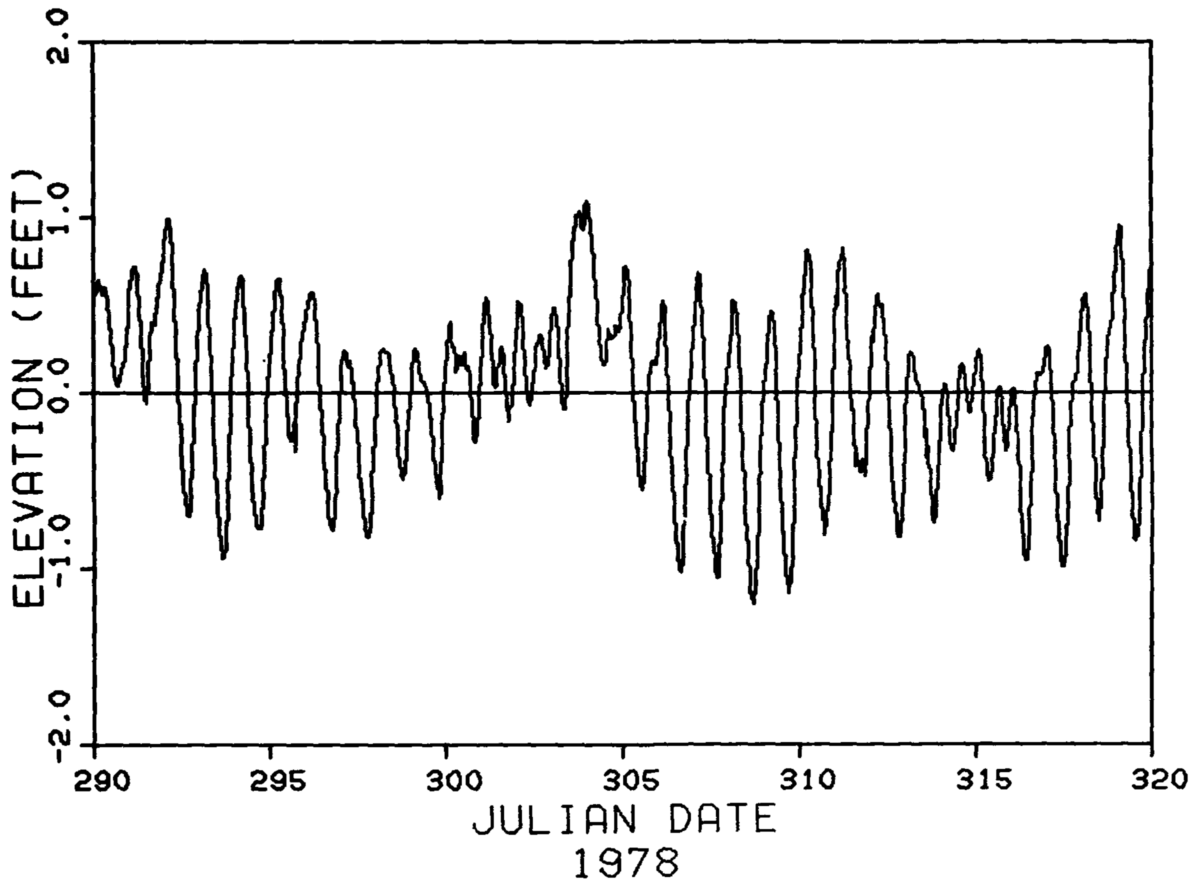
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA
GAGE B-6
DAY 260 TO DAY 290 1978

AD-A112 996 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG--ETC F/G 8/8
LAKE PONTCHARTRAIN AND VICINITY HURRICANE PROTECTION PLAN, REPO--ETC(U)
JAN 82 D G OUTLAW
UNCLASSIFIED WES/TR/HL-82-2-1 NL

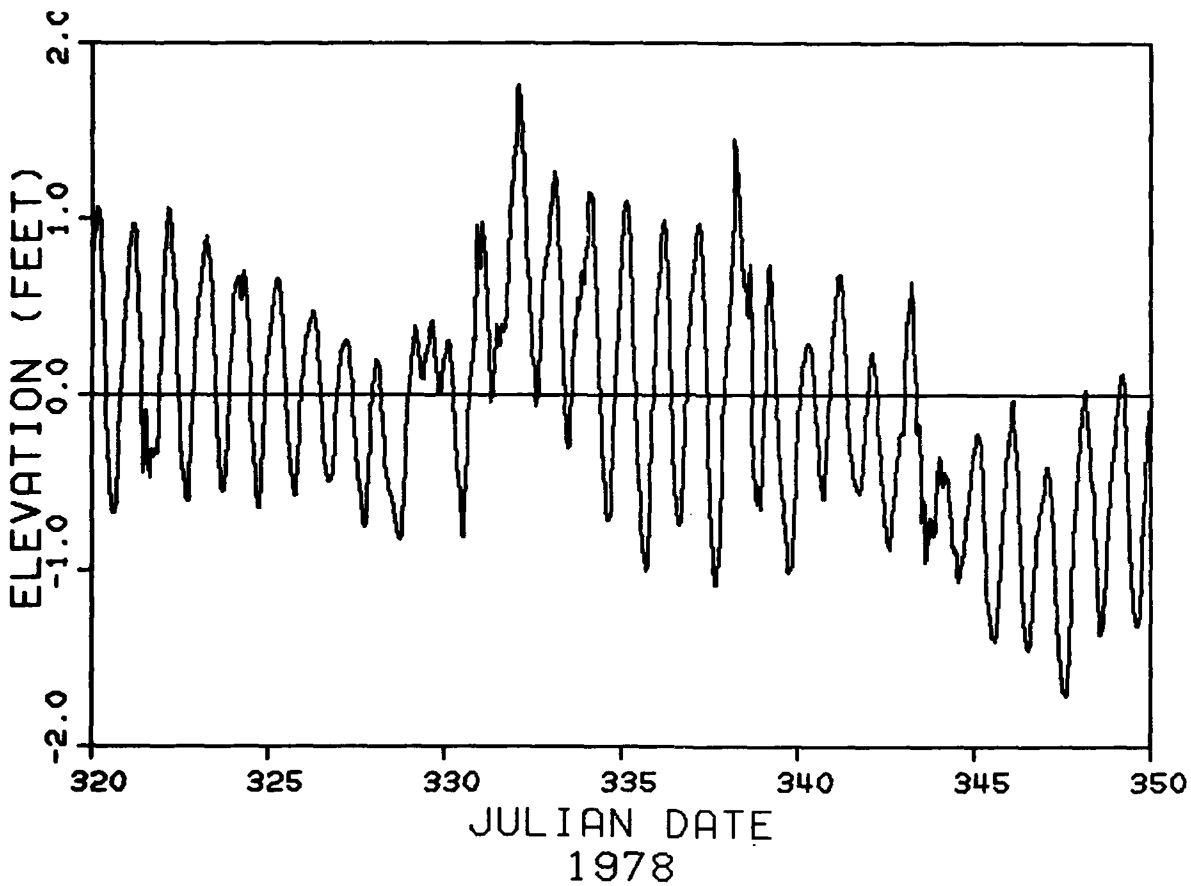
2 of 7


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA
GAGE B-6
DAY 290 TO DAY 320 1978

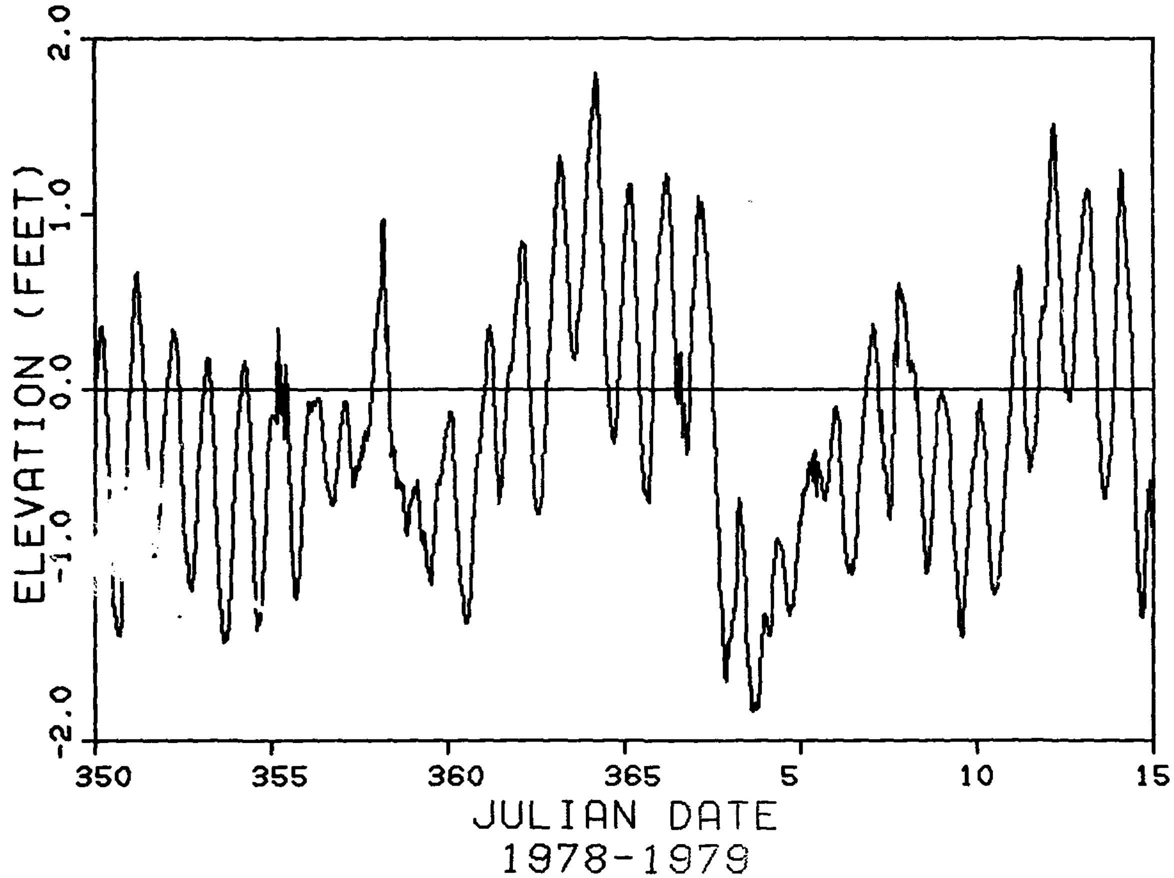


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE B-6

DAY 320 TO DAY 350 1978

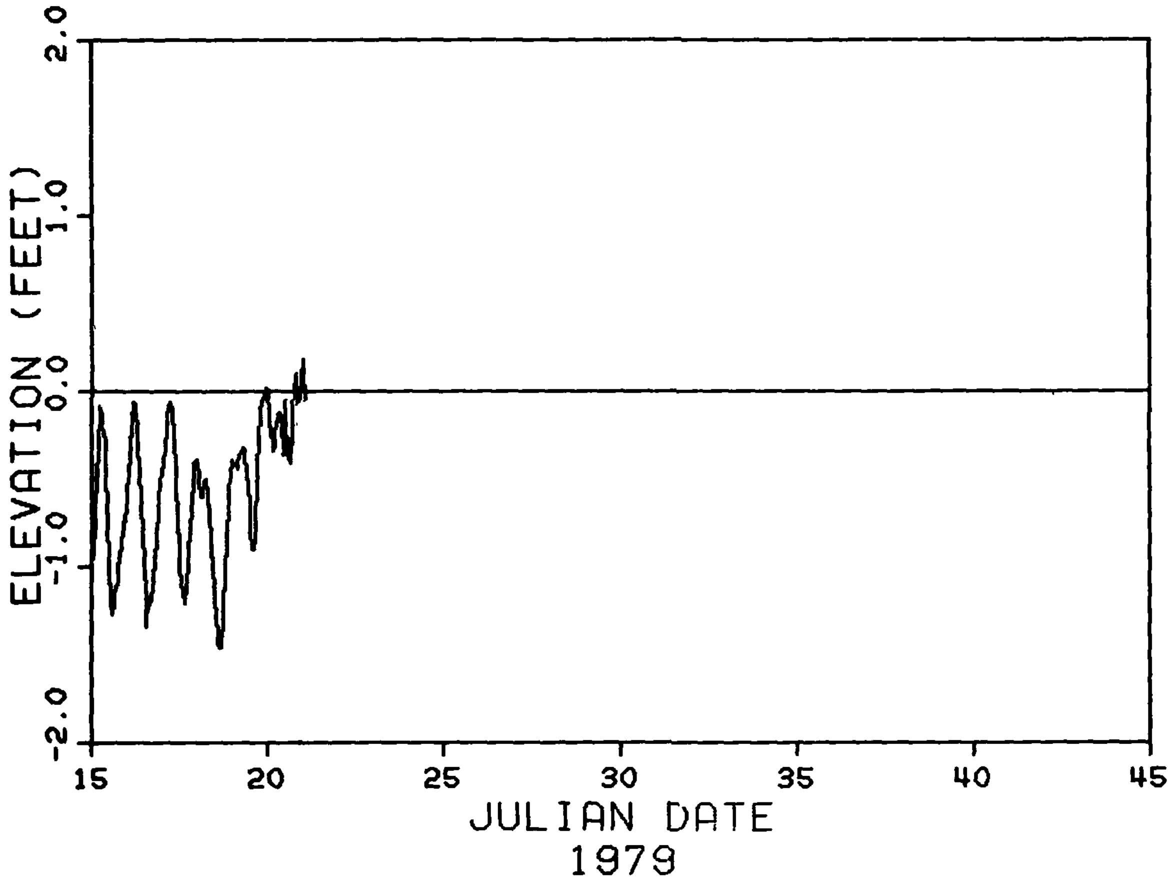


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE B-6

DAY 350 1978 TO DAY 15 1979

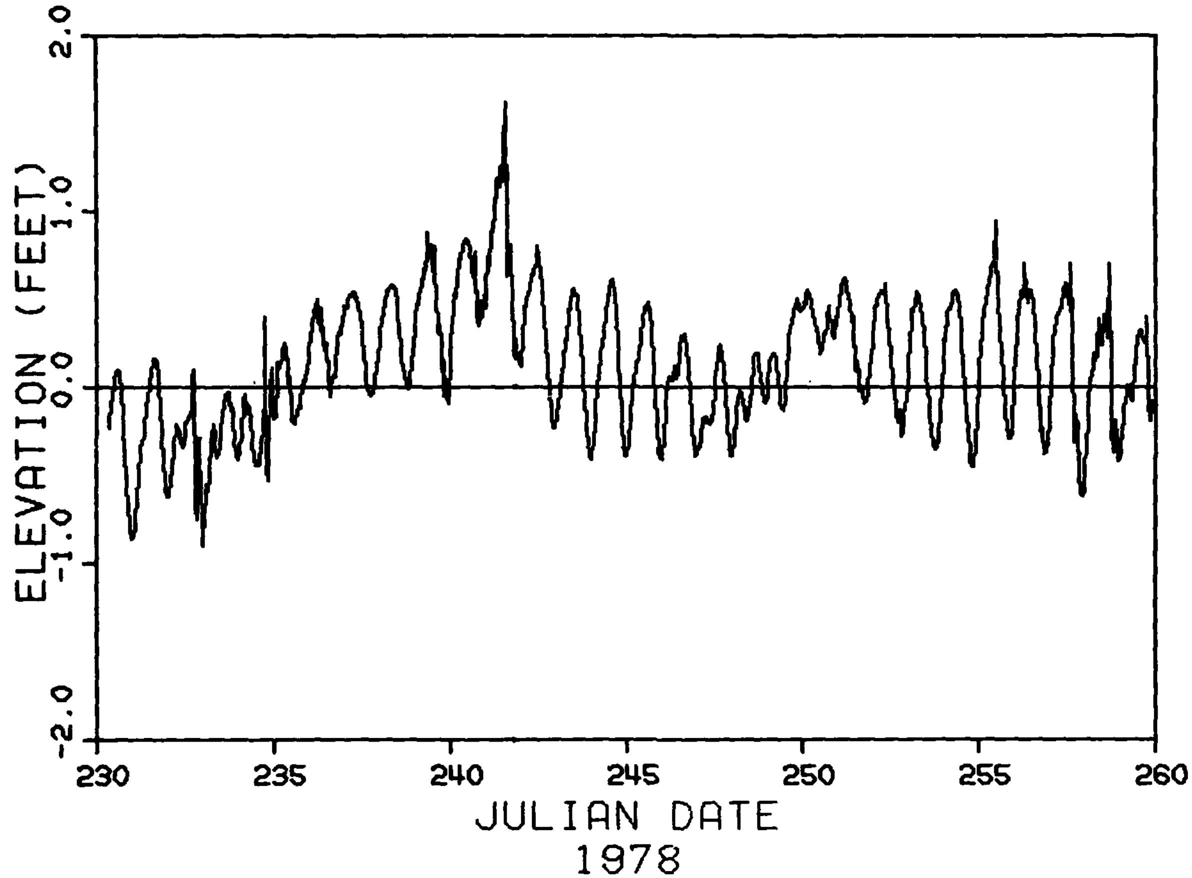


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RFCORD.

OBSERVED TIDE ELEVATION DATA

GAGE B-6

DAY 15 TO DAY 45 1979

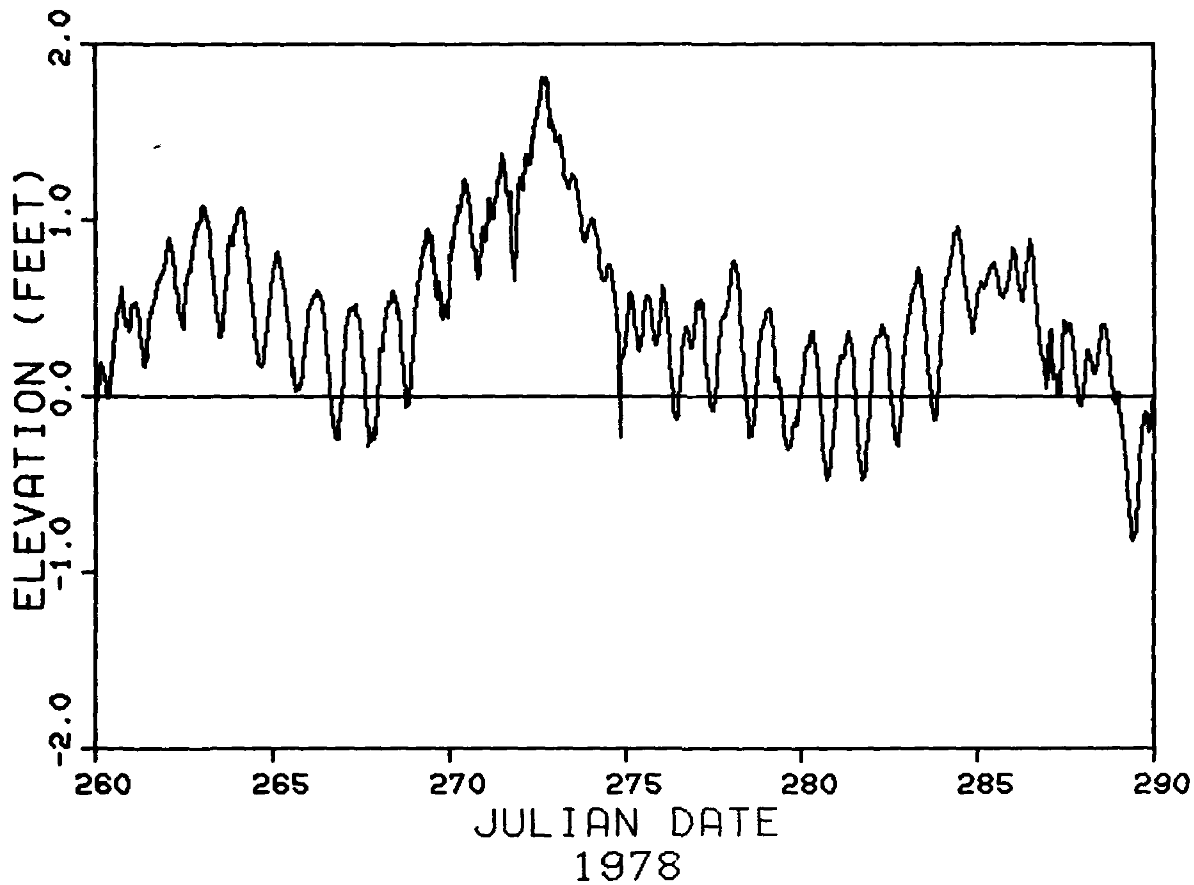


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE R-1

DAY 230 TO DAY 260 1978

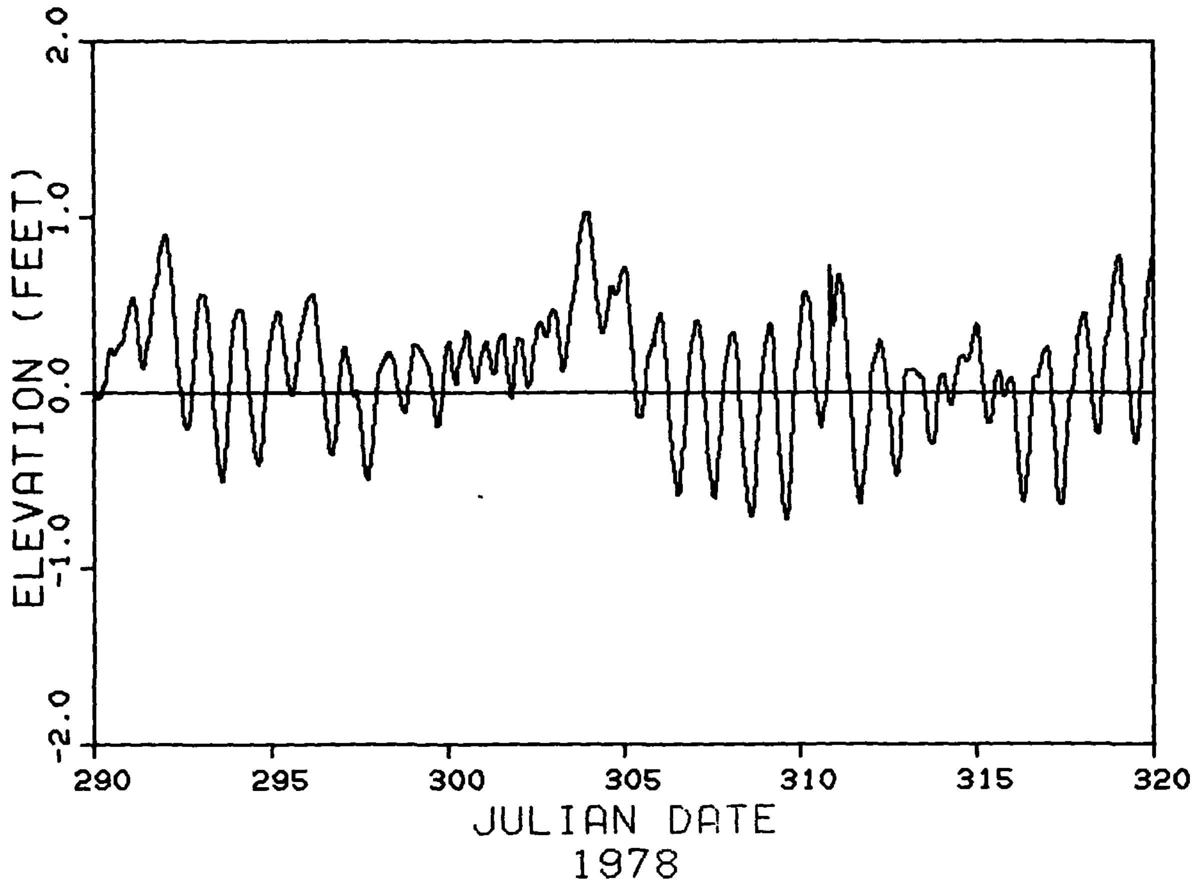


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE R-1

DAY 260 TO DAY 290 1978

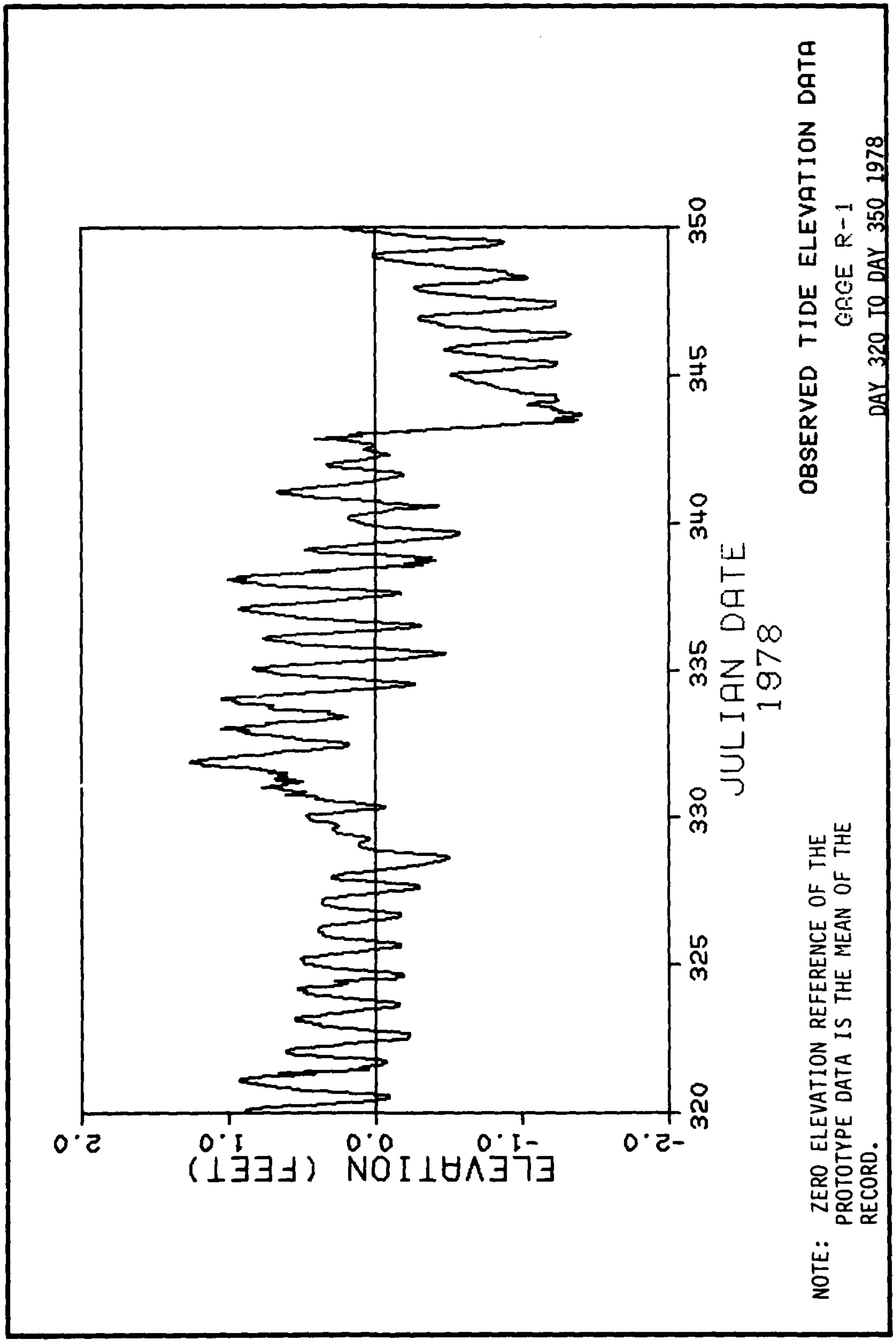


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE R-1

DAY 290 TO DAY 320 1978

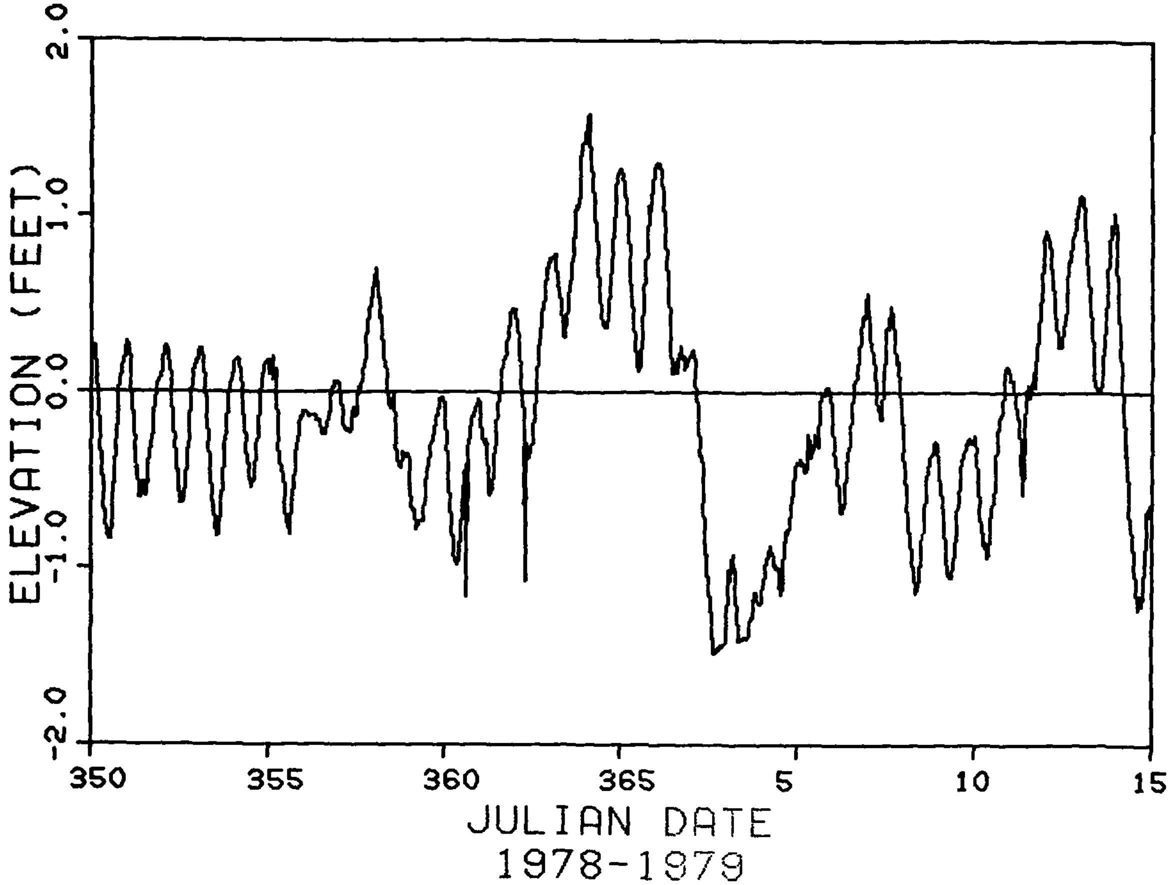


OBSERVED TIDE ELEVATION DATA

GAGE R-1

DAY 320 TO DAY 350 1978

PLATE 16

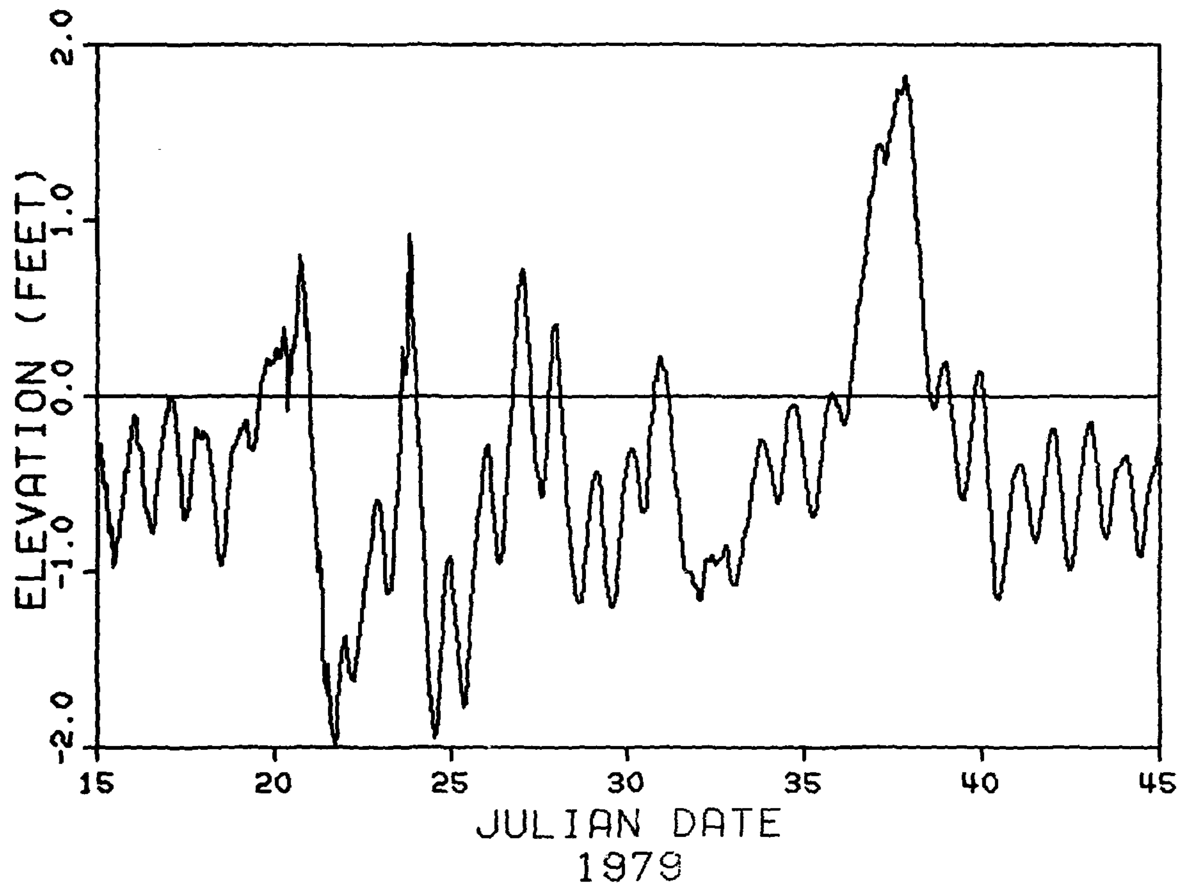


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE R-1

DAY 350 1978 TO DAY 15 1979

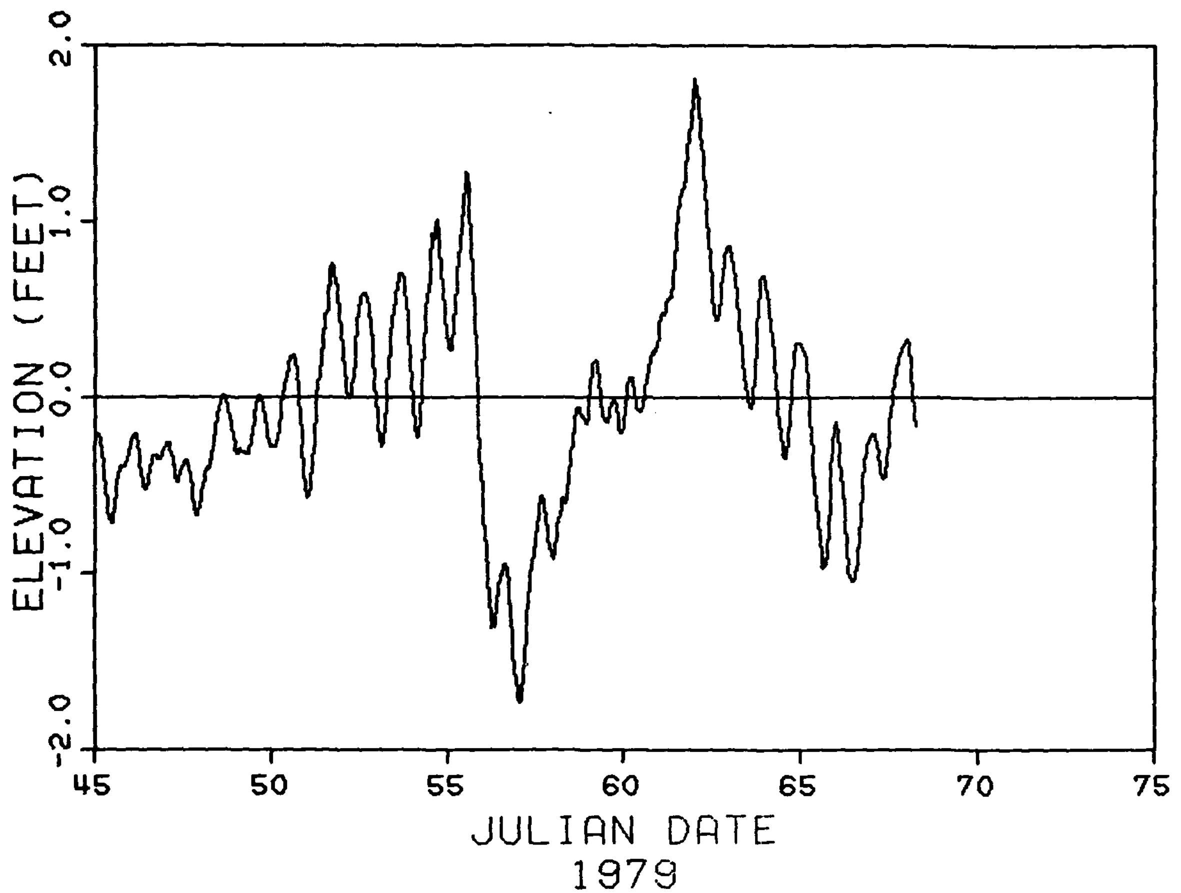


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE R-1

DAY 15 TO DAY 45 1979

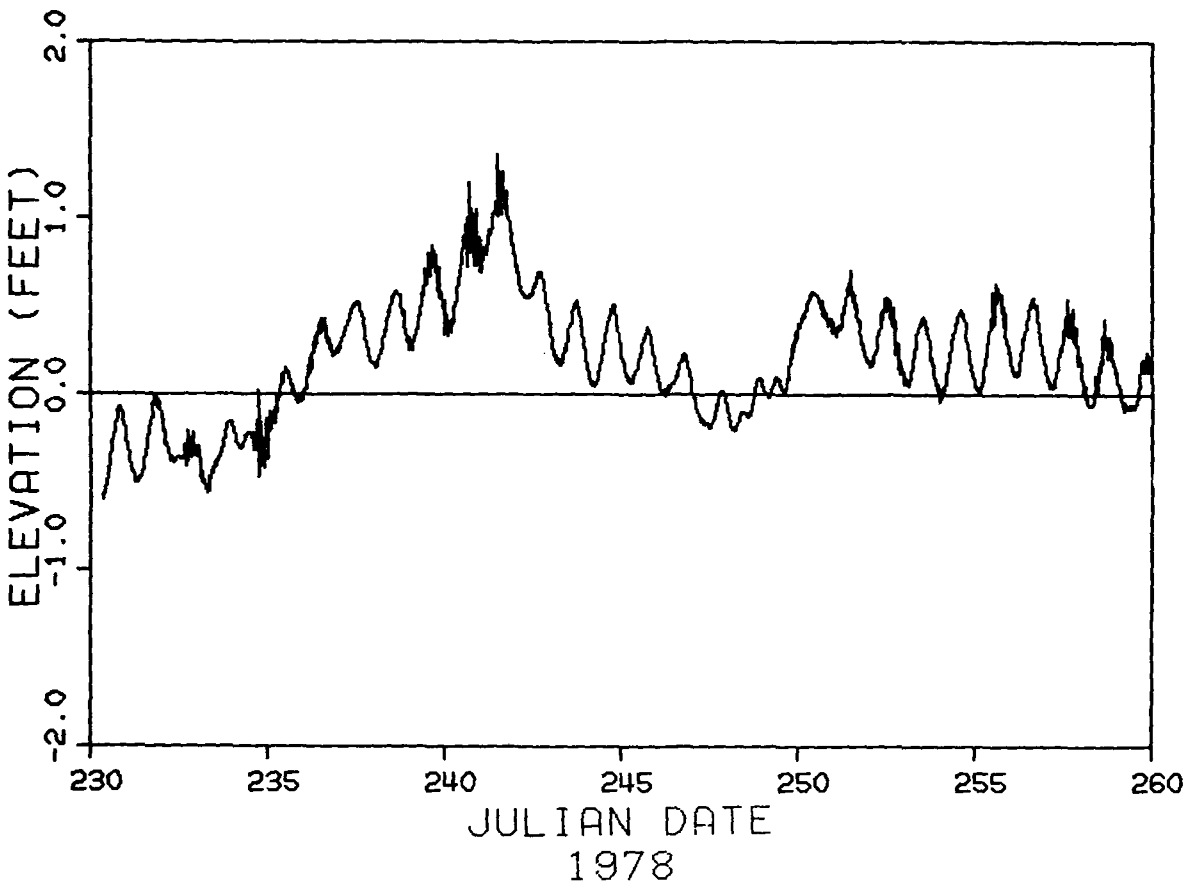


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE R-1

DAY 45 TO DAY 75 1979

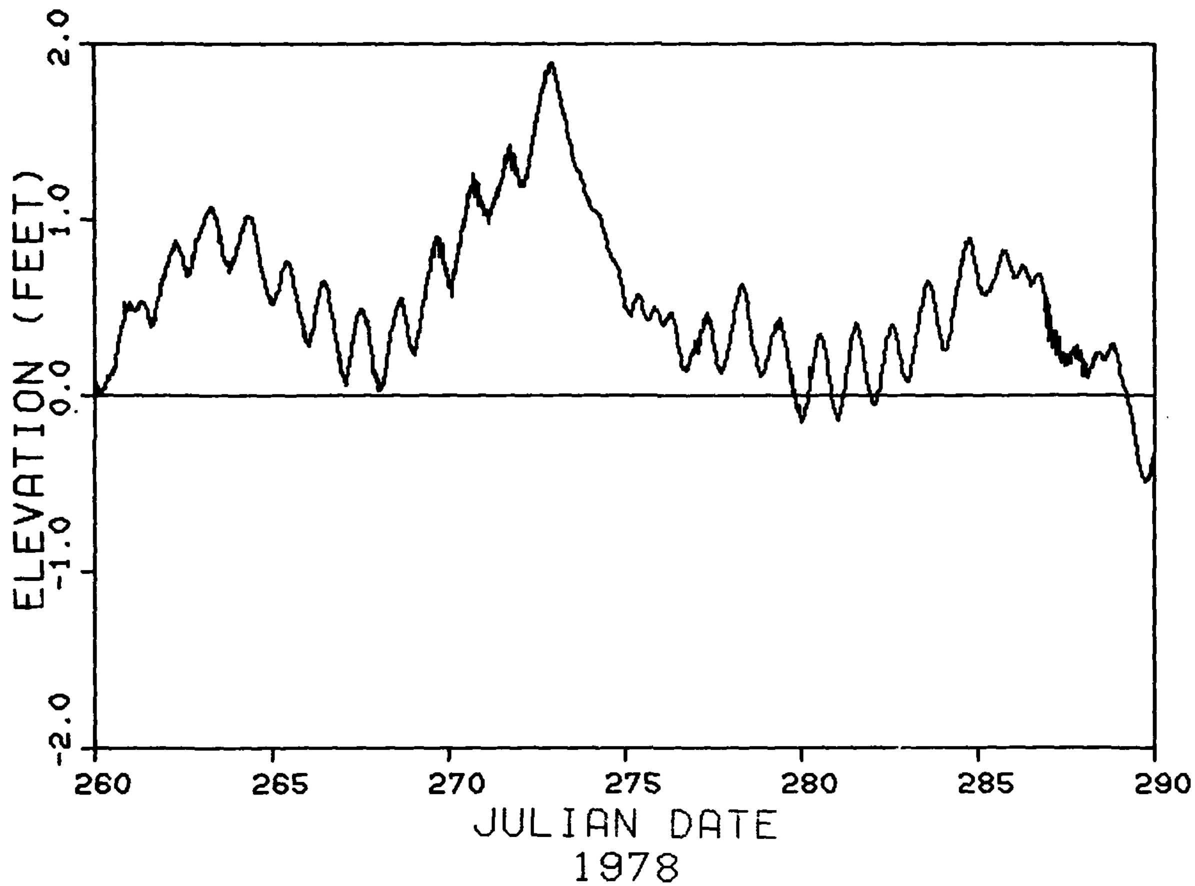


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE P-4

DAY 230 TO DAY 260 1978

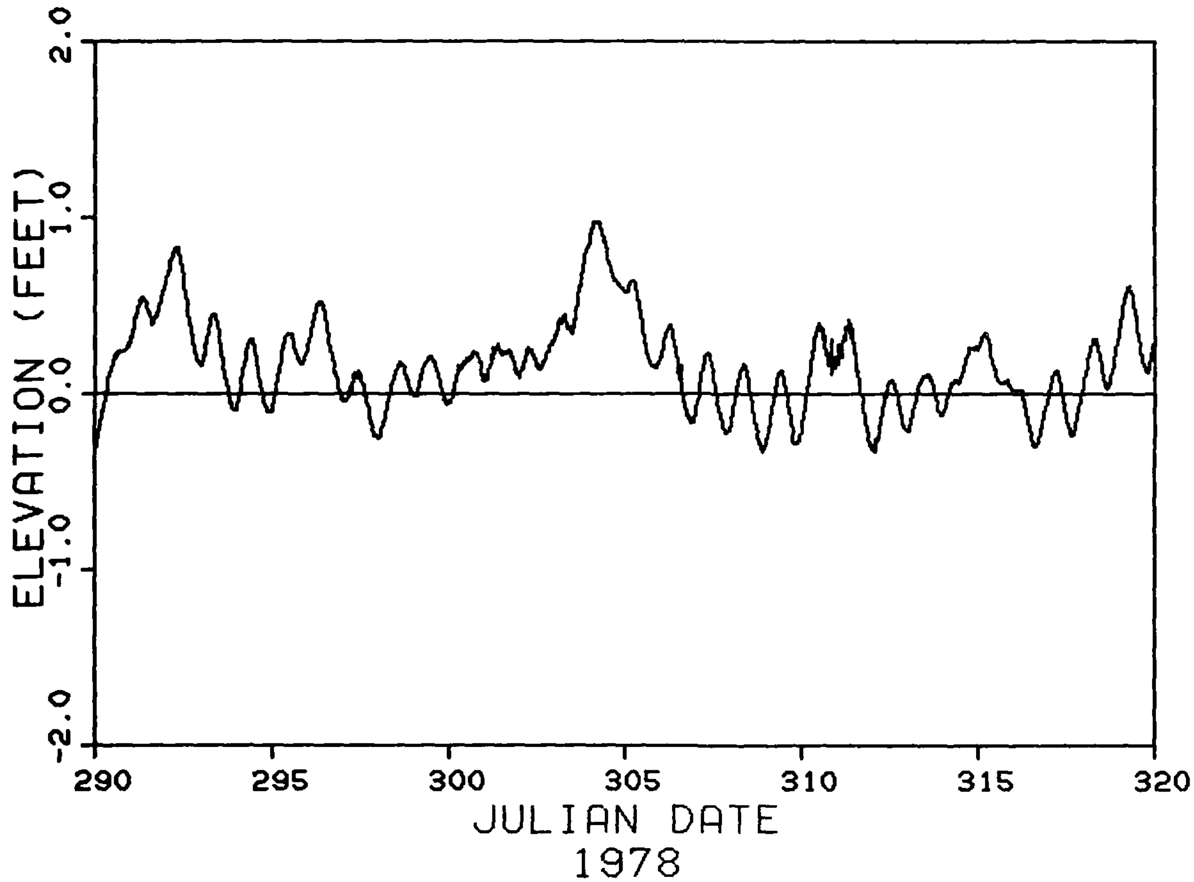


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE P-4

DAY 260 TO DAY 290 1978

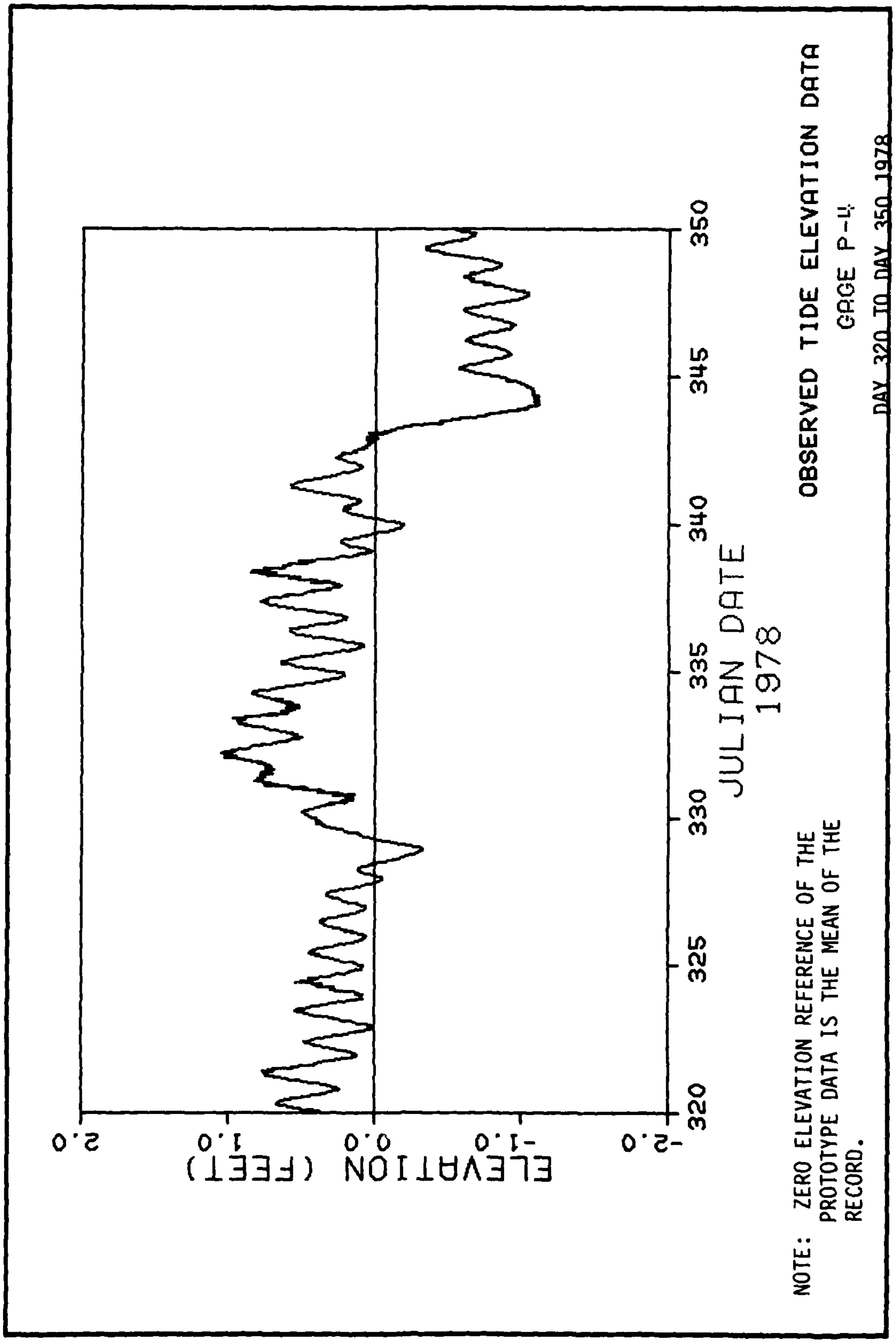


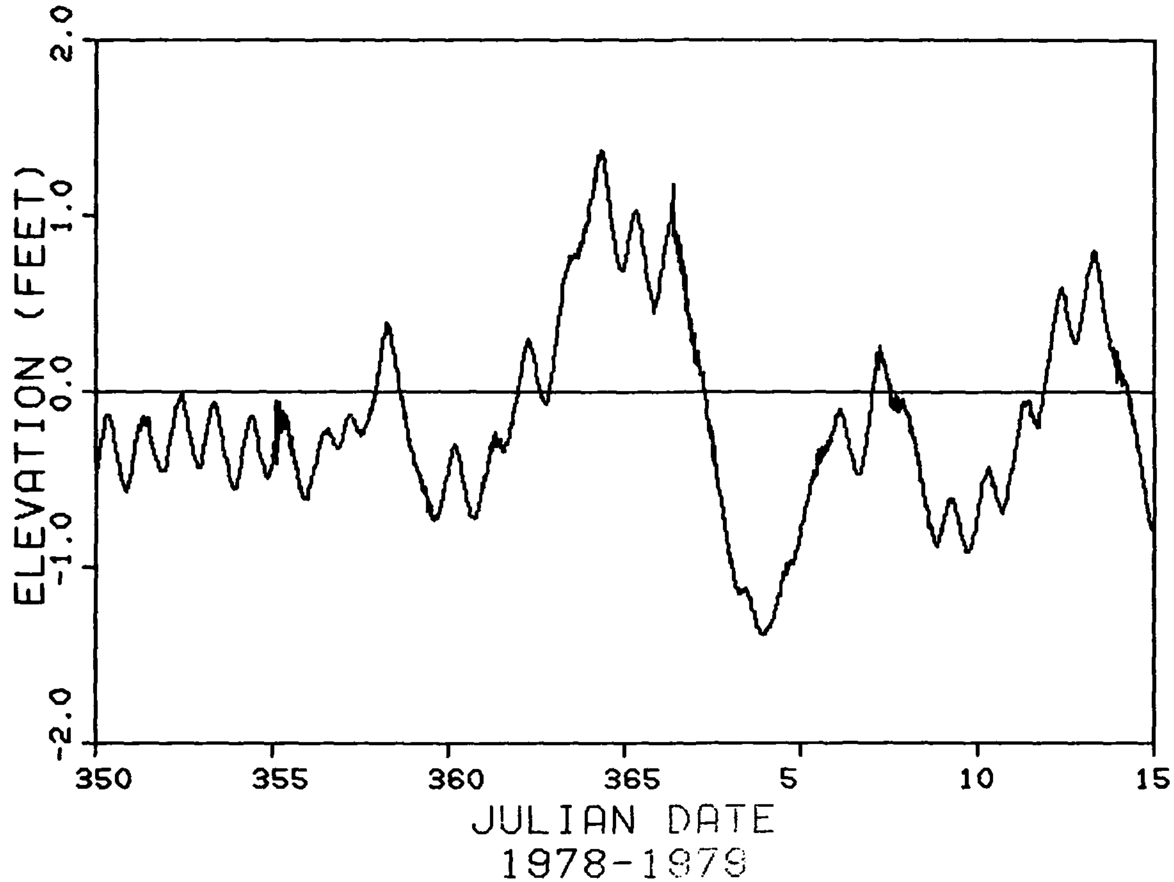
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE P-4

DAY 290 TO DAY 320 1978


OBSERVED TIDE ELEVATION DATA
GAGE P-4
DAY 320 TO DAY 350 1978
ELEVATION (FEET)
2.0
1.0
0.0
-1.0
-2.0
320
325
330
335
340
345
350
JULIAN DATE
1978
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

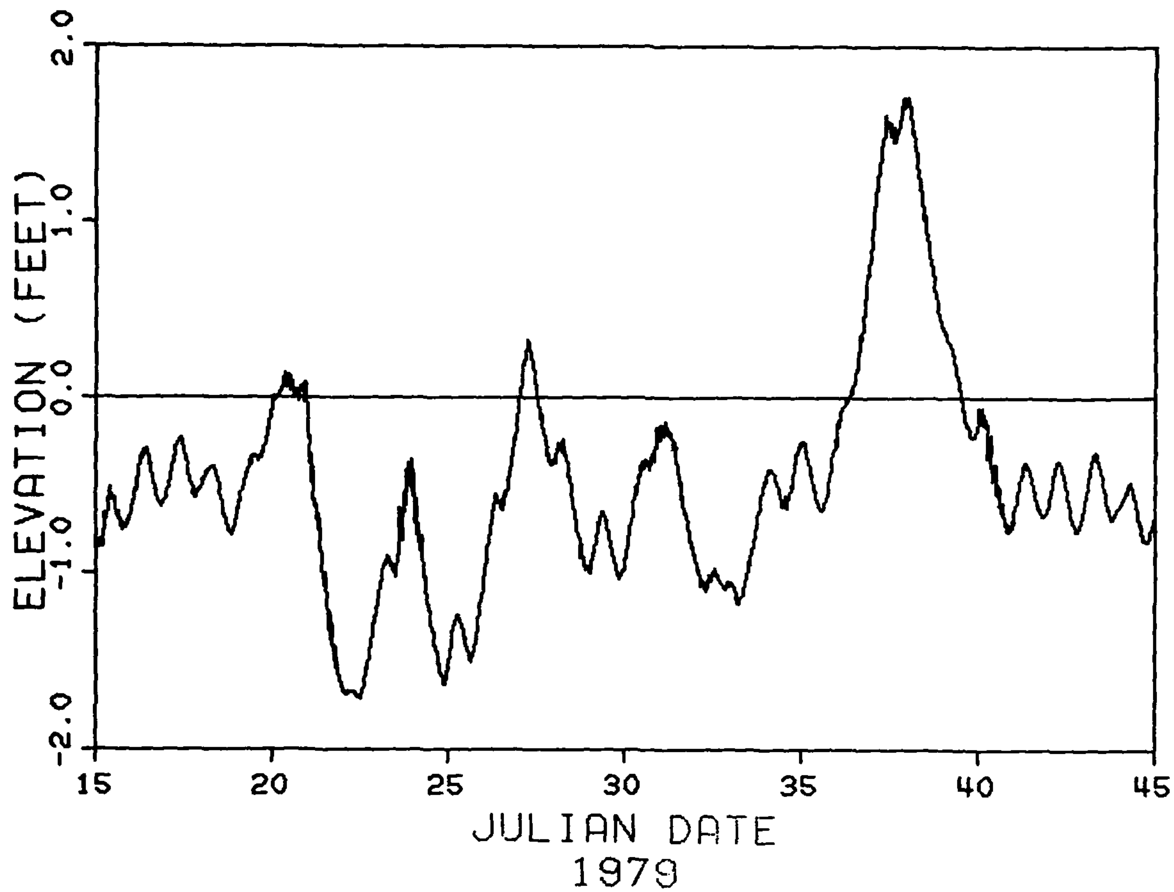


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE P-4

DAY 350 1978 TO DAY 15 1979

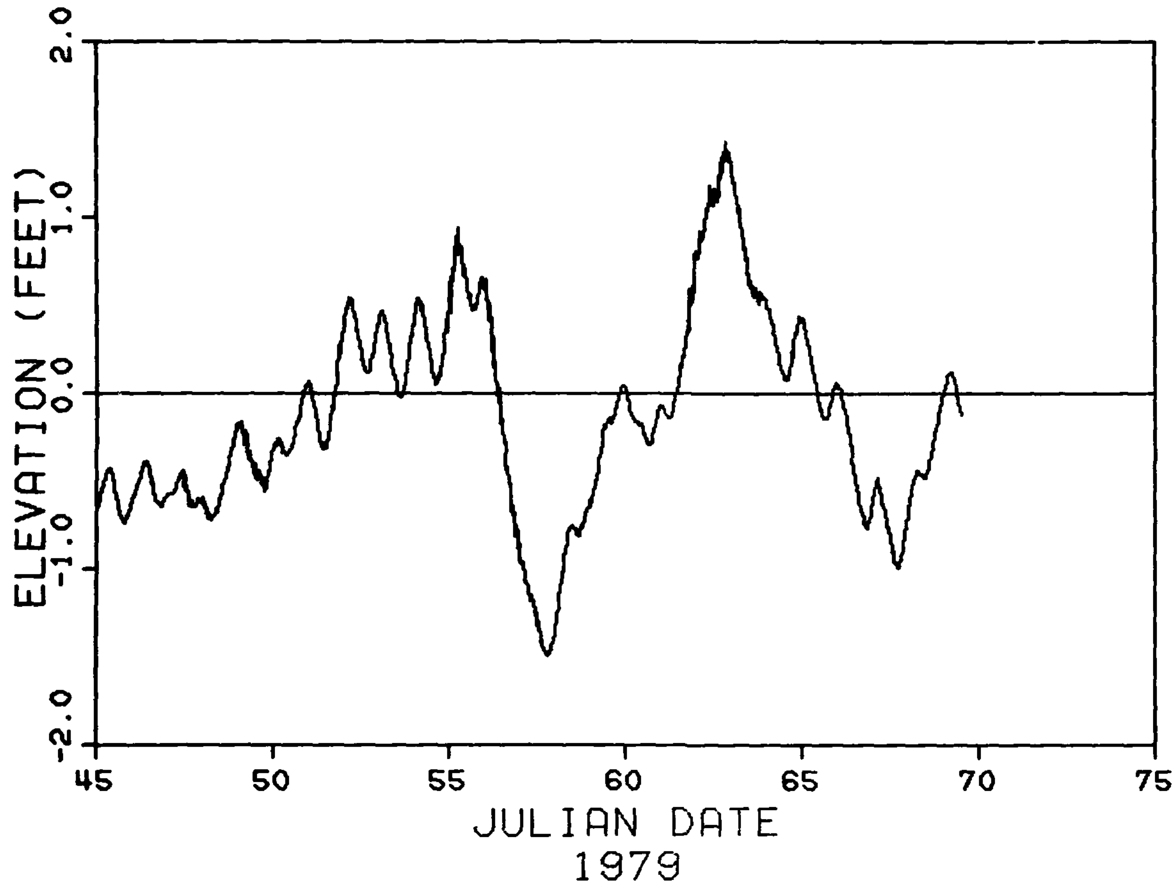


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE P-4

DAY 15 TO DAY 45 1979

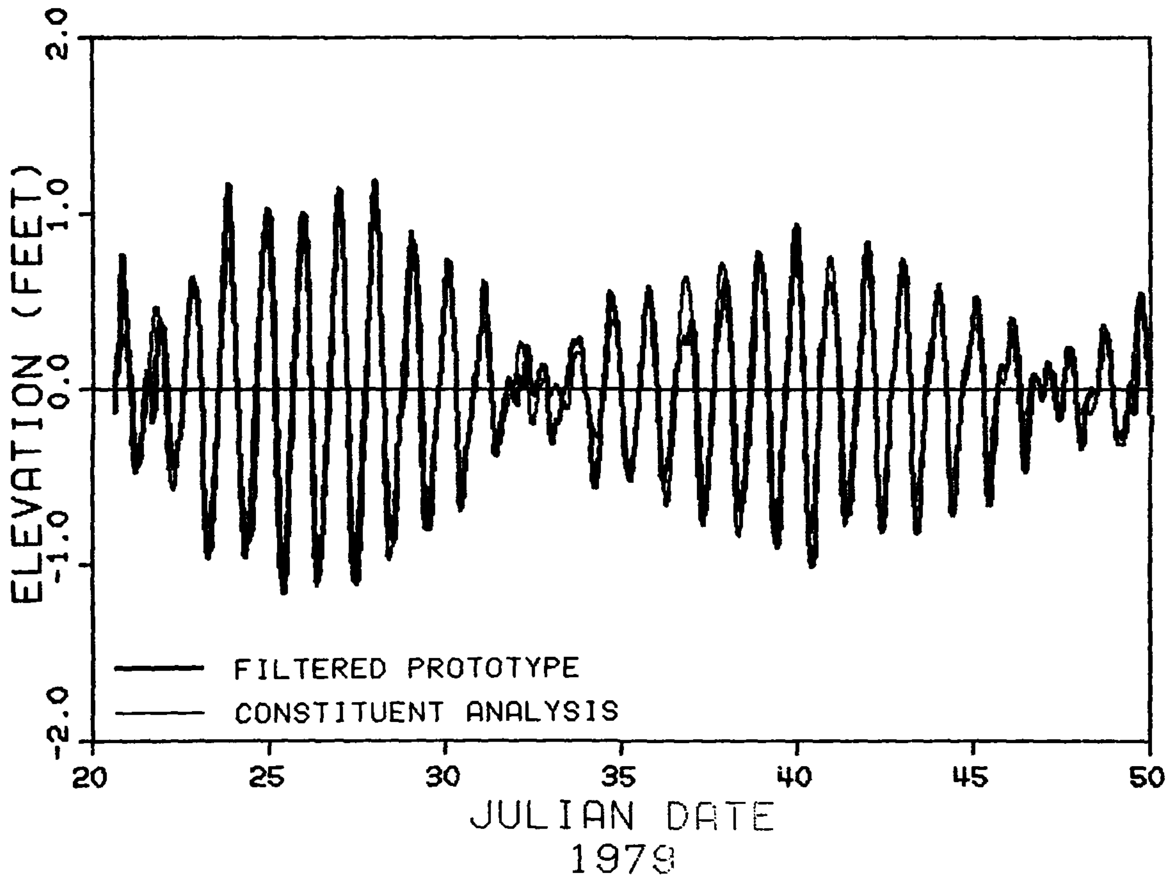


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE P-4

DAY 45 TO DAY 75 1979

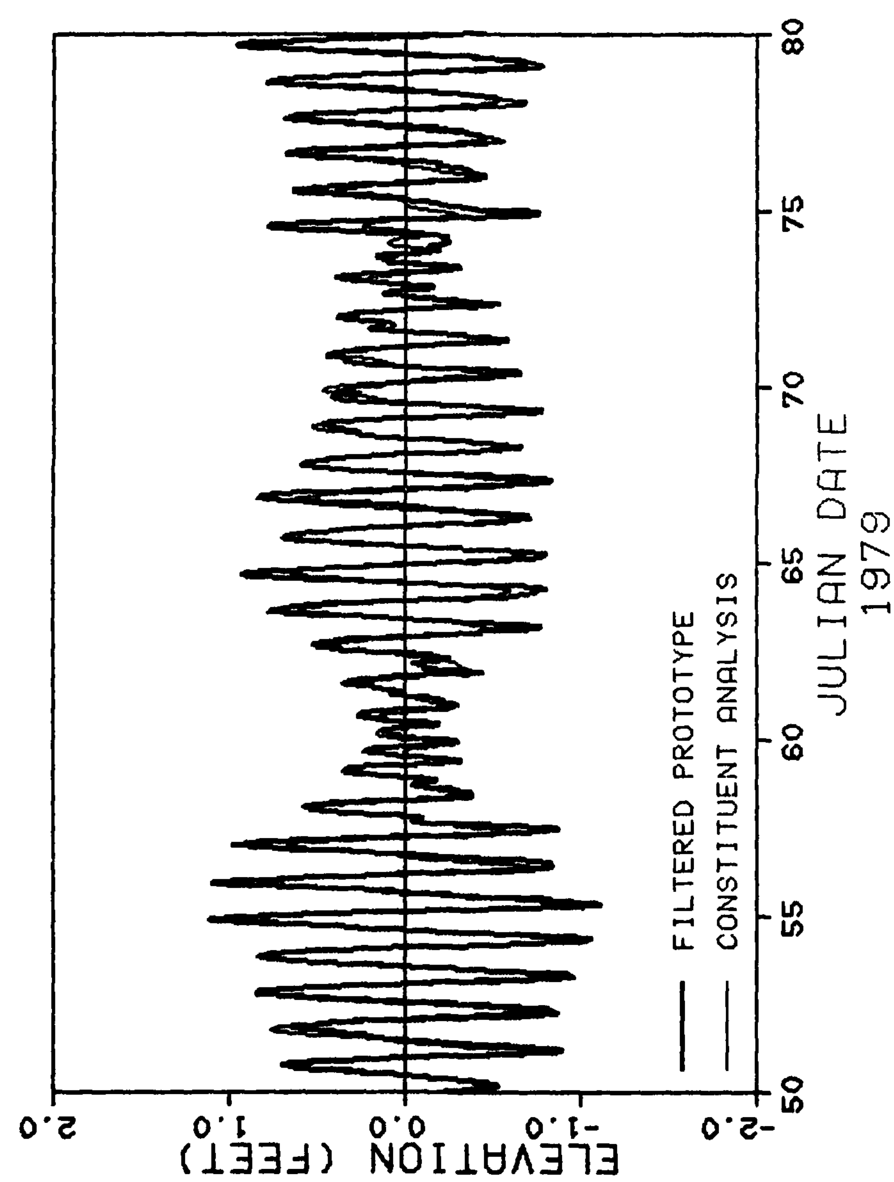


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

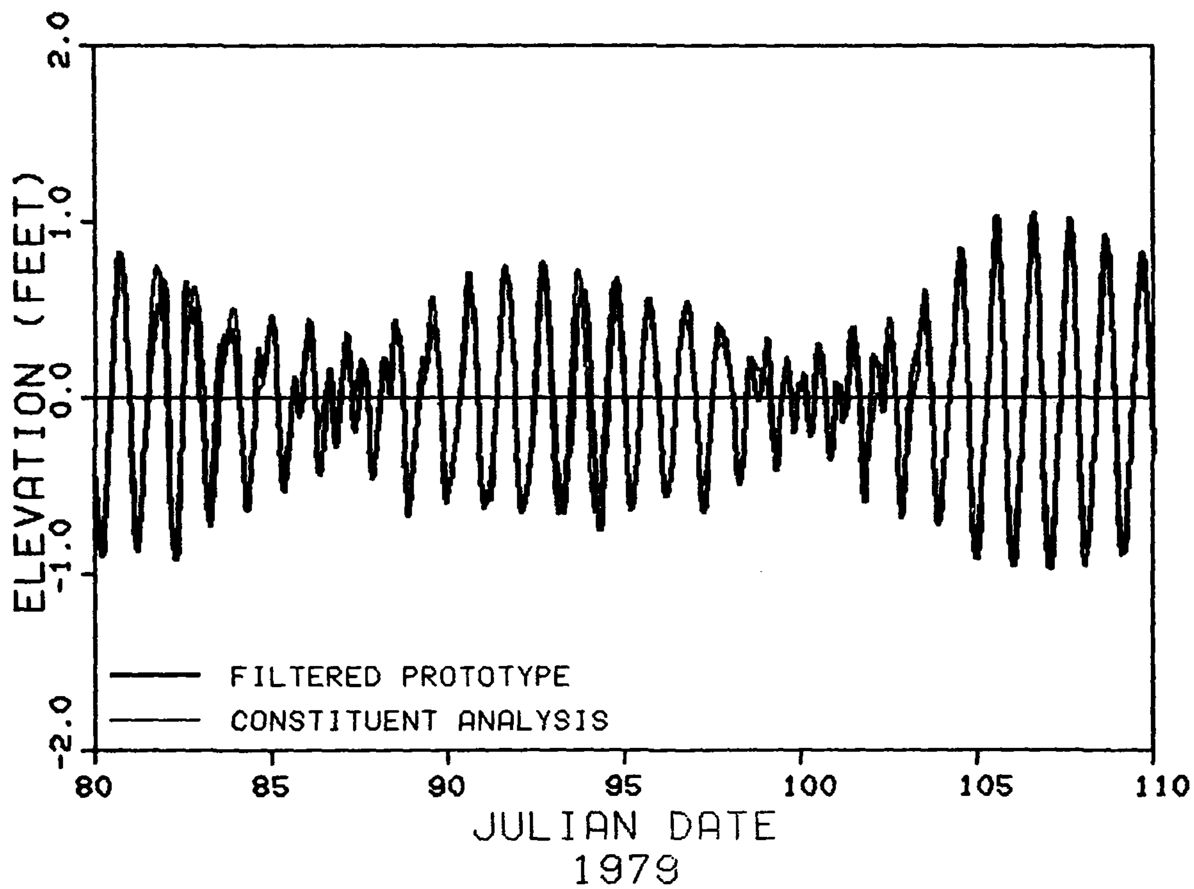
GAGE B-1

DAY 20 TO DAY 50 1979



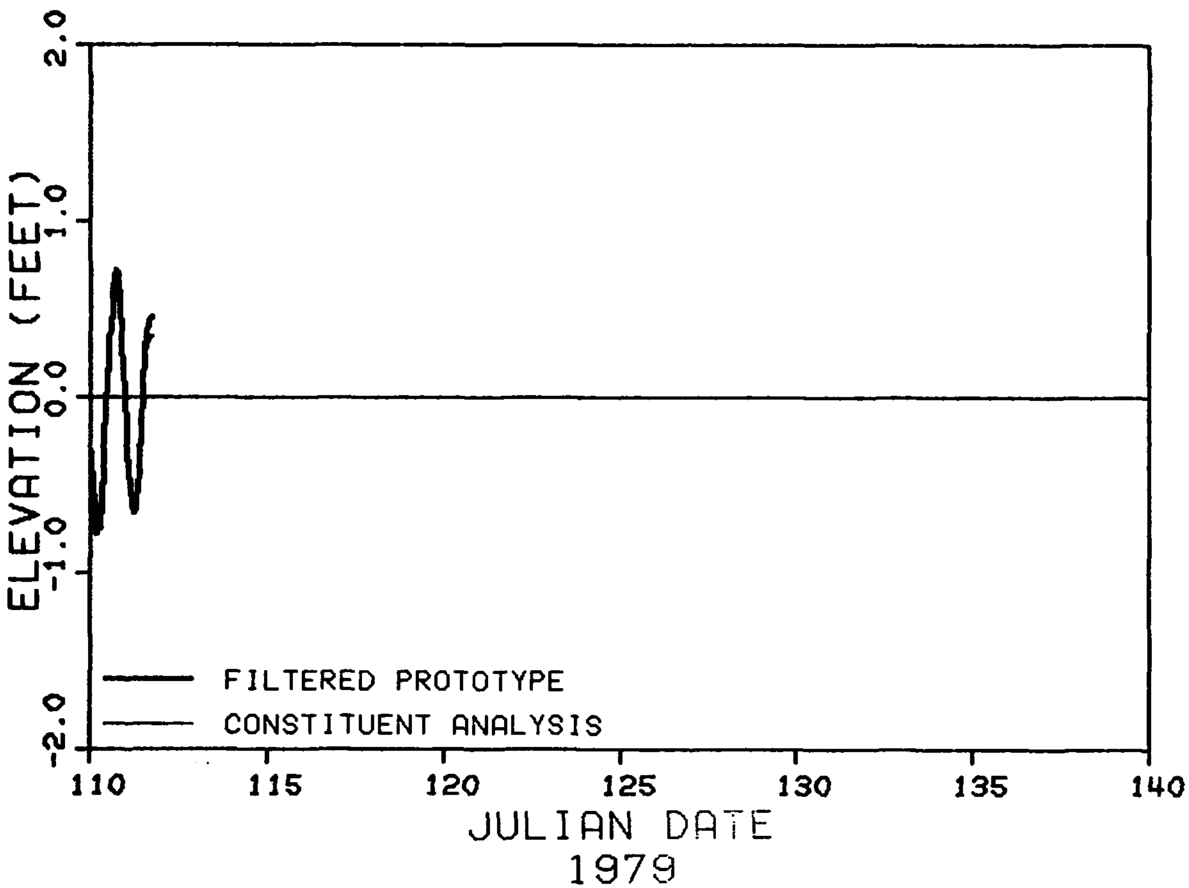
TIDAL ELEVATION ANALYSIS
GAGE B-1
DAY 50 TO DAY 80 1979

NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.



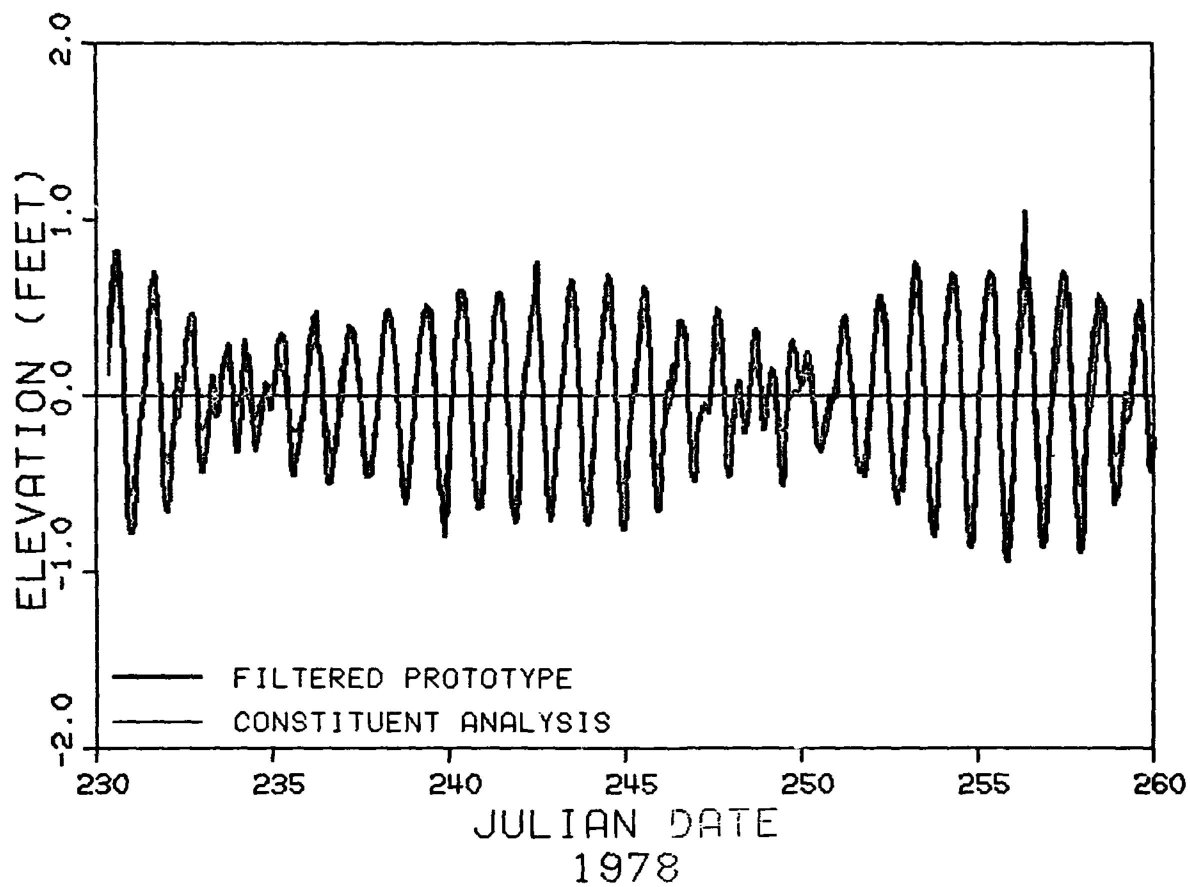
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-1
DAY 80 TO DAY 110 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-1
DAY 110 TO DAY 140 1979

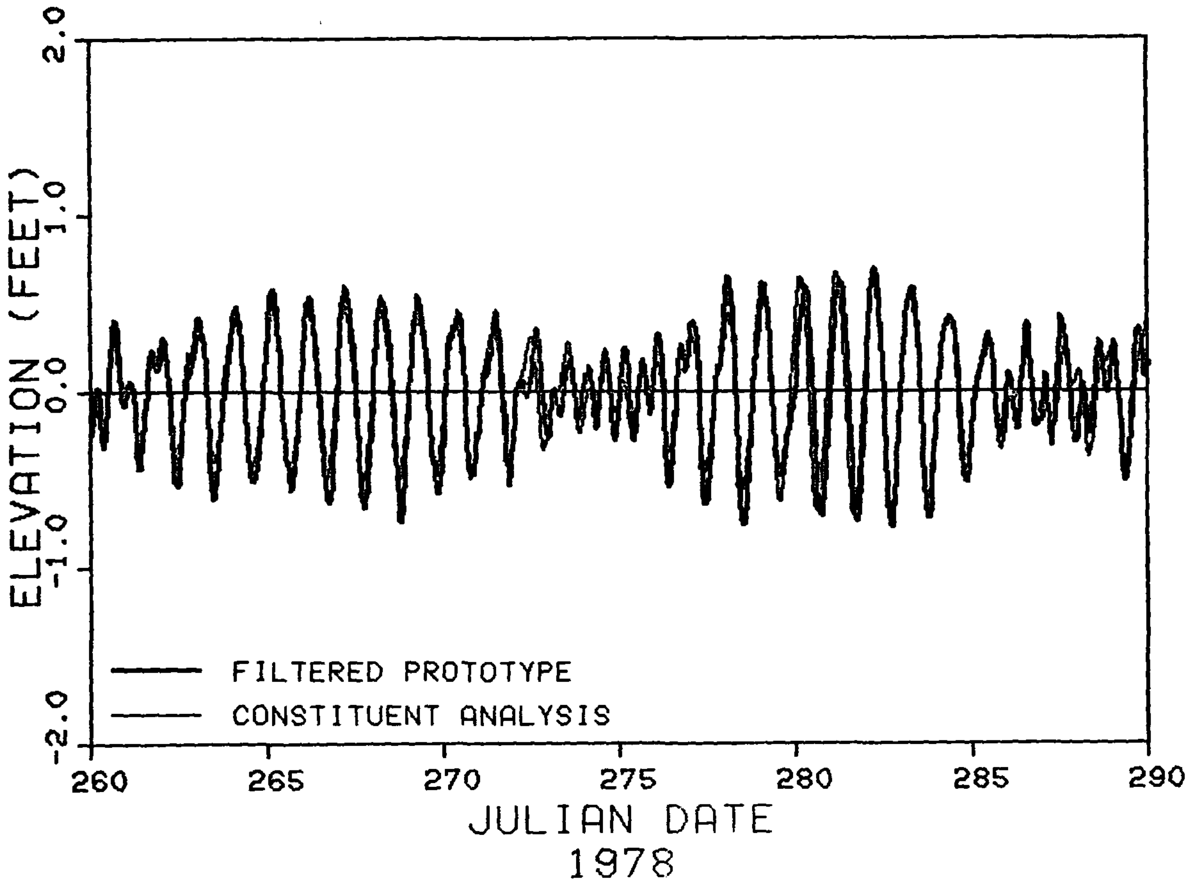


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-2

DAY 230 TO DAY 260 1978

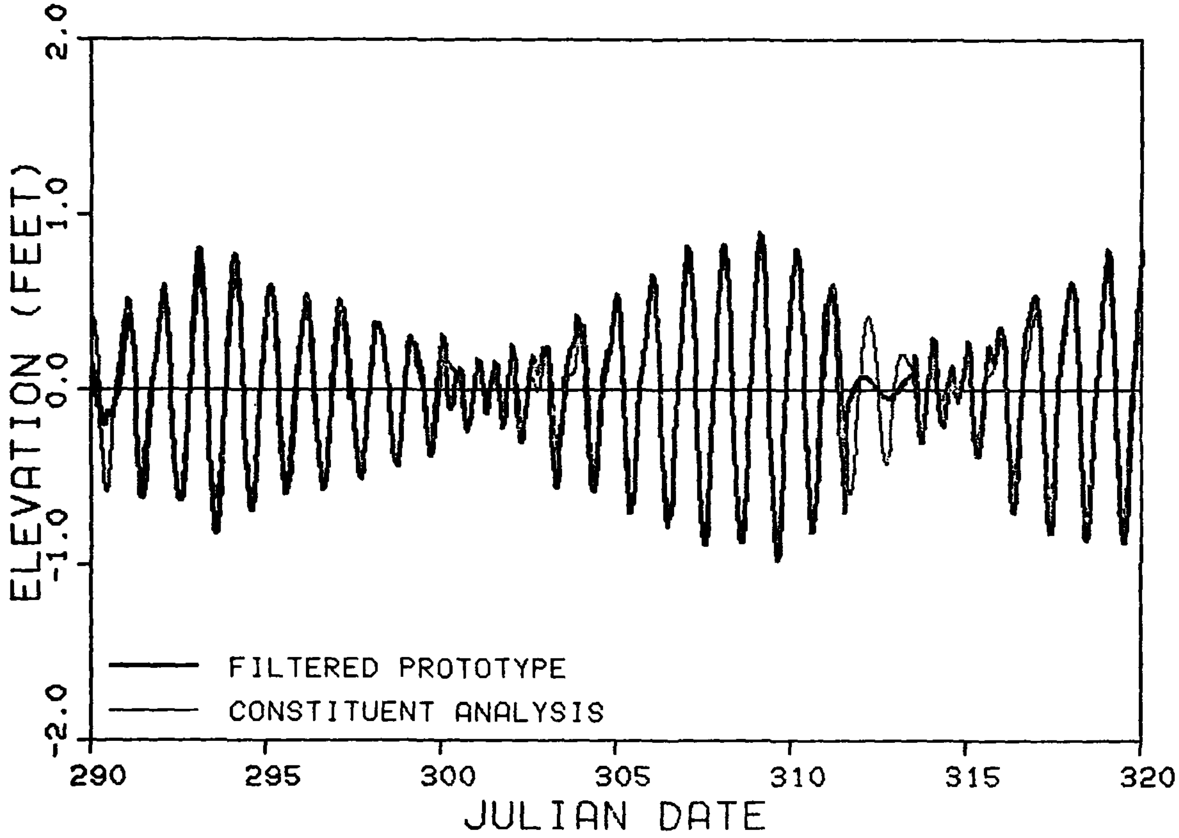


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

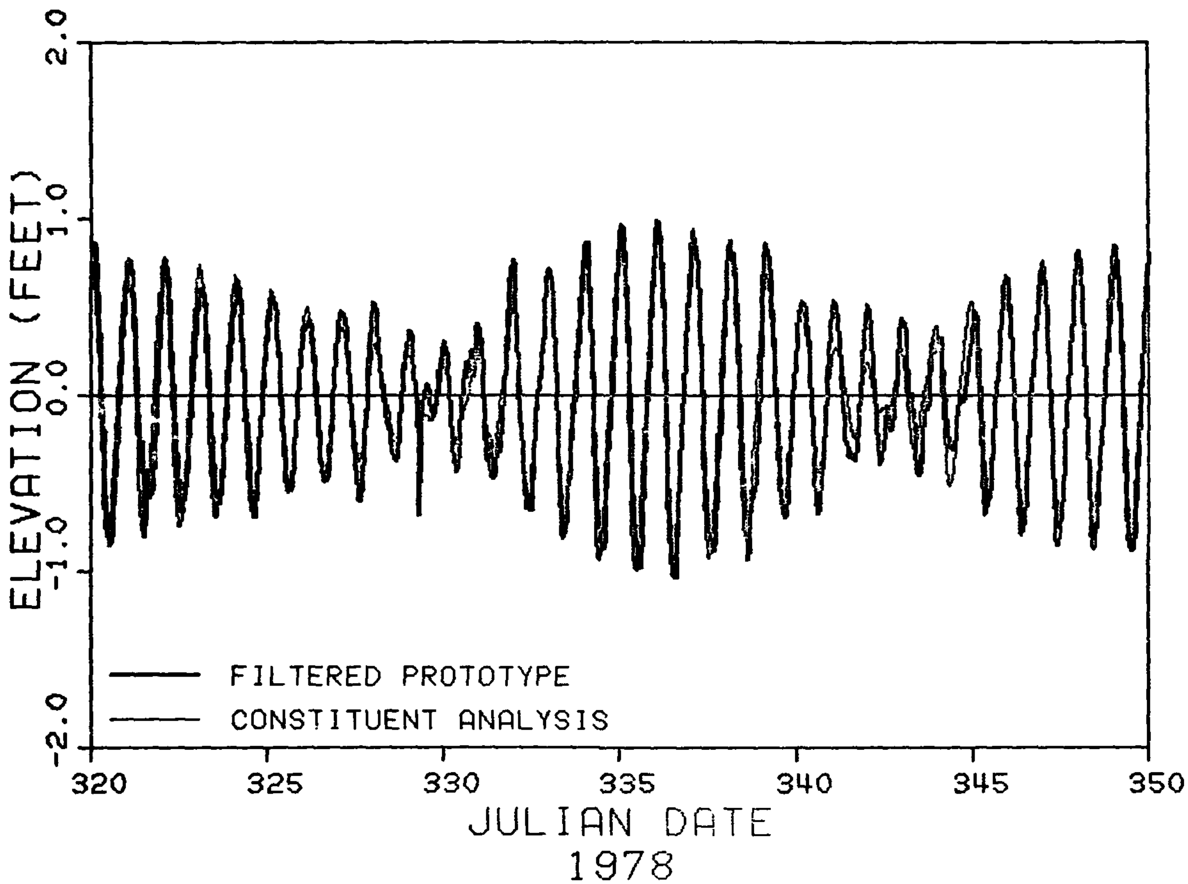
GAGE B-2

DAY 260 TO DAY 290 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-2
DAY 290 TO DAY 320 1978

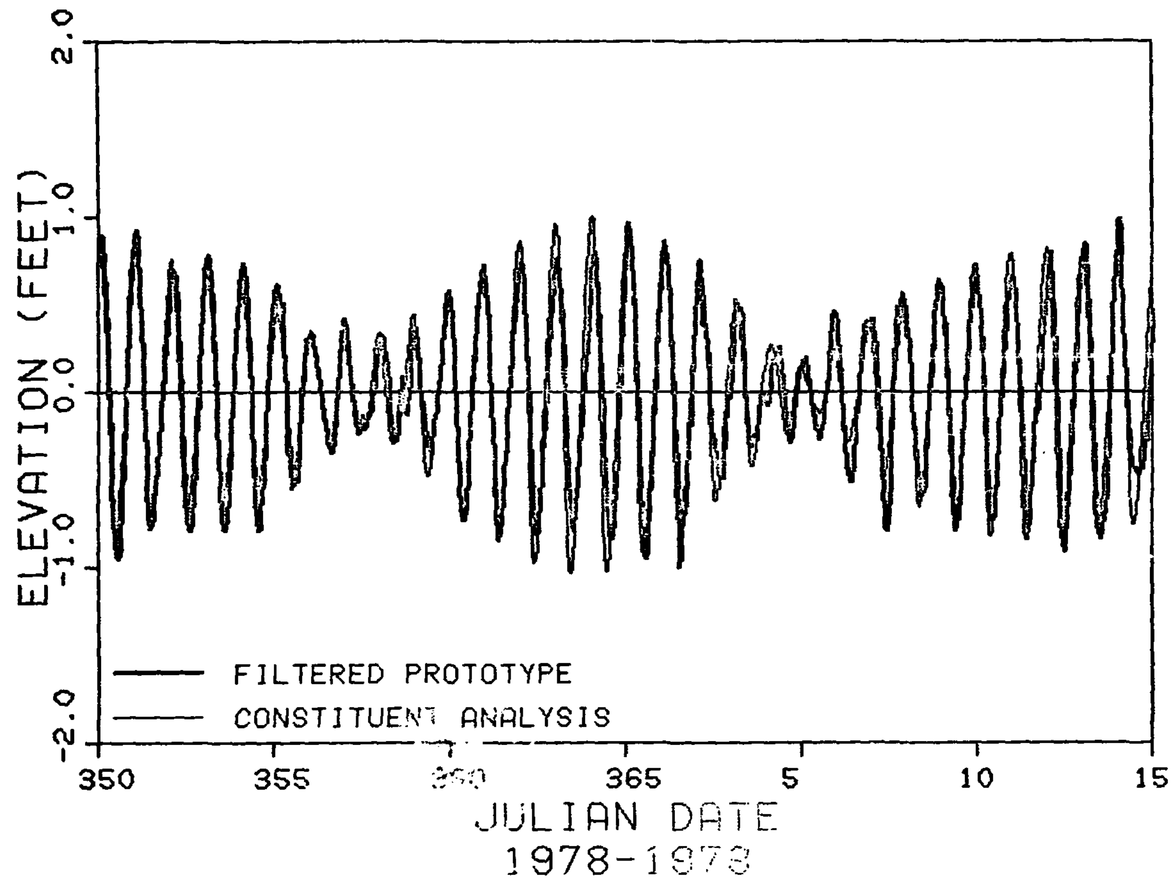


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

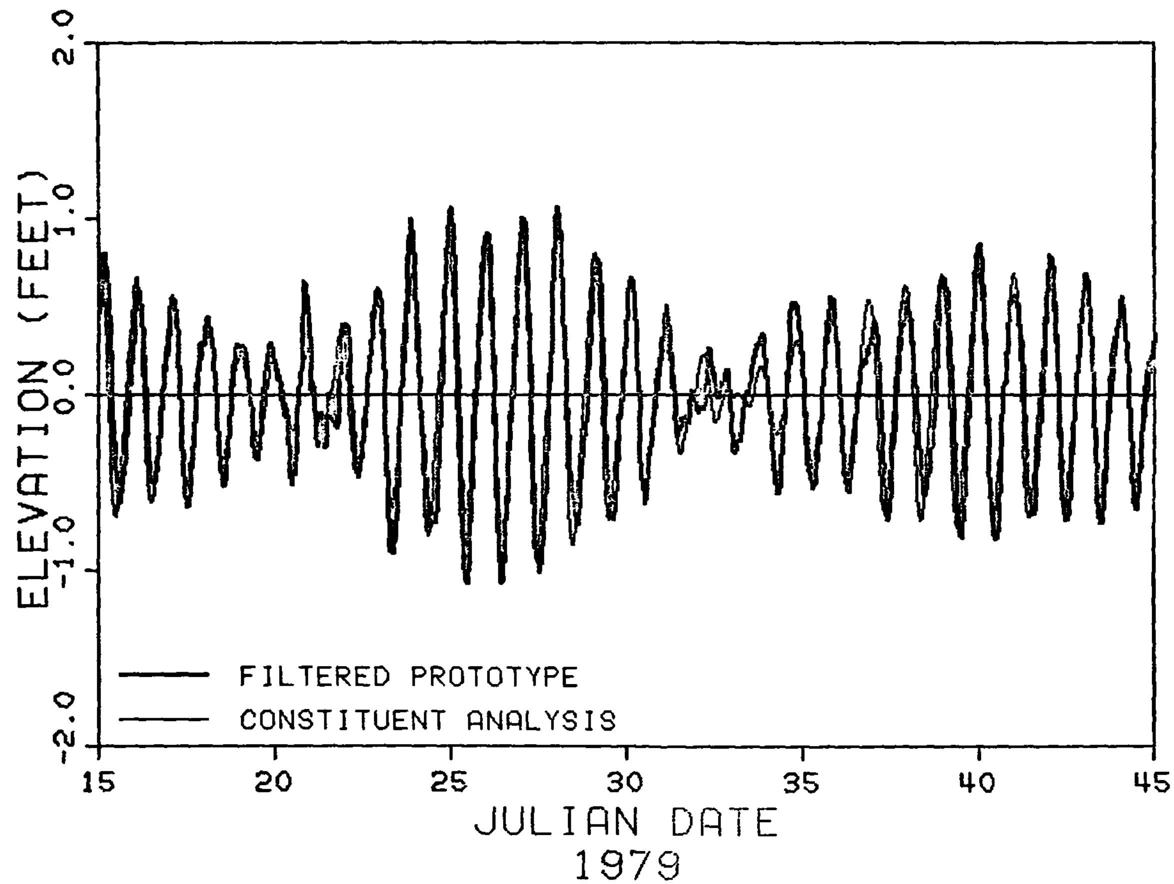
GAGE B-2

DAY 320 TO DAY 350 1978



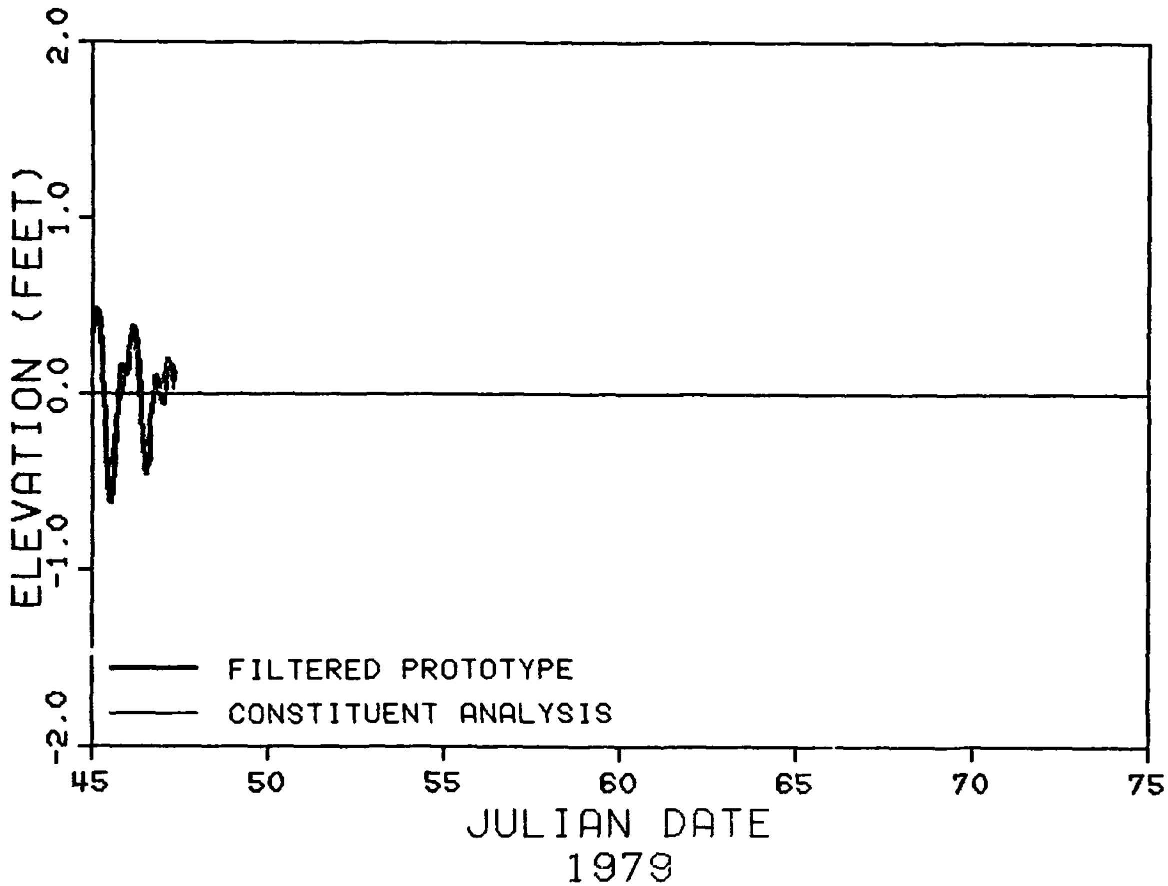
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-2
DAY 350 1978 TO DAY 15 1979



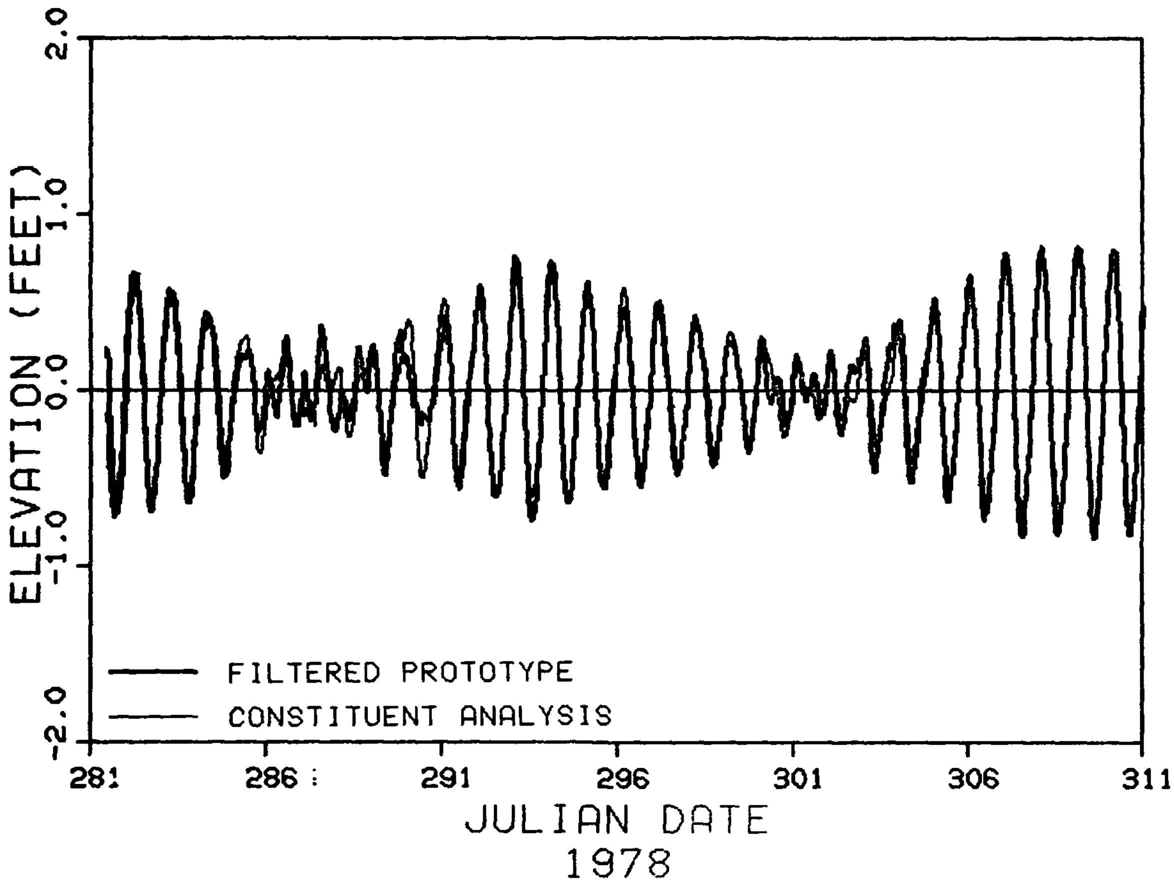
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-2
DAY 15 TO DAY 45 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-2
DAY 45 TO DAY 75 1979

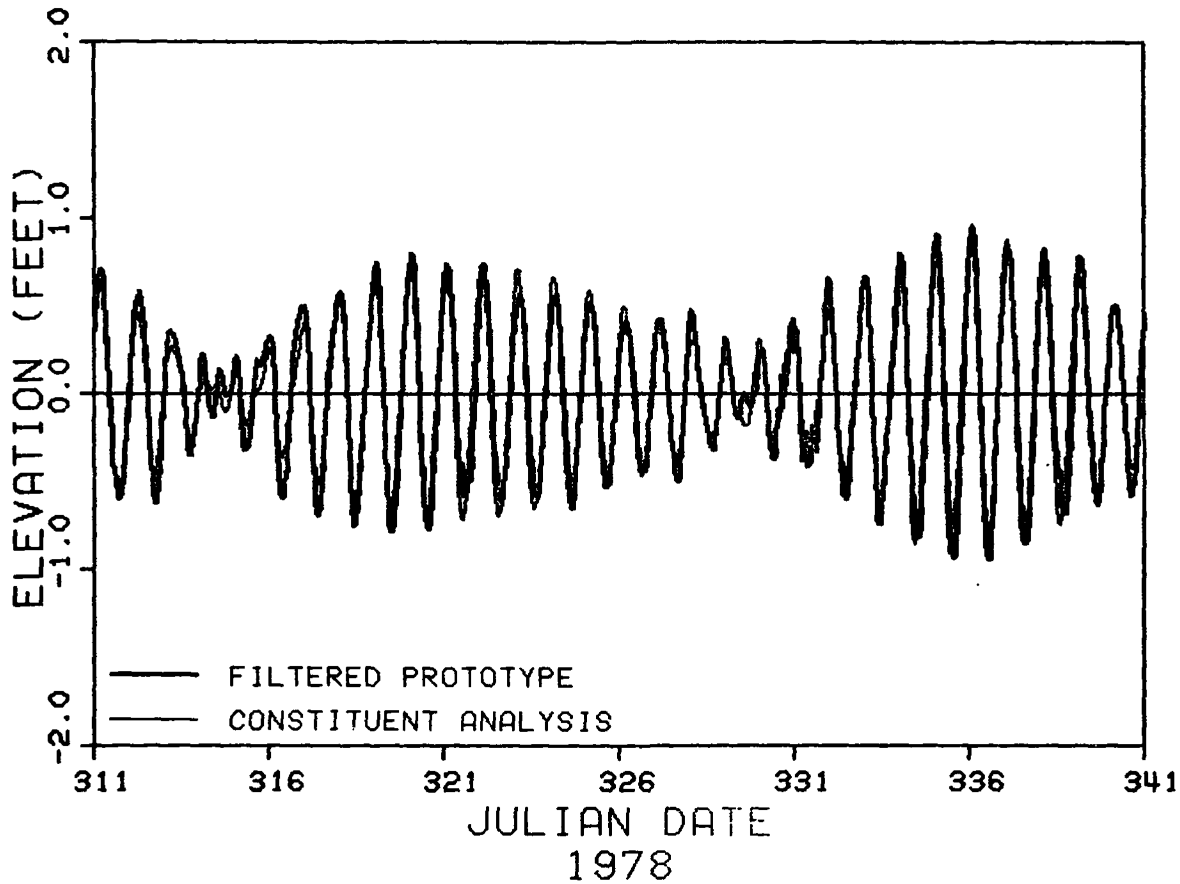


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

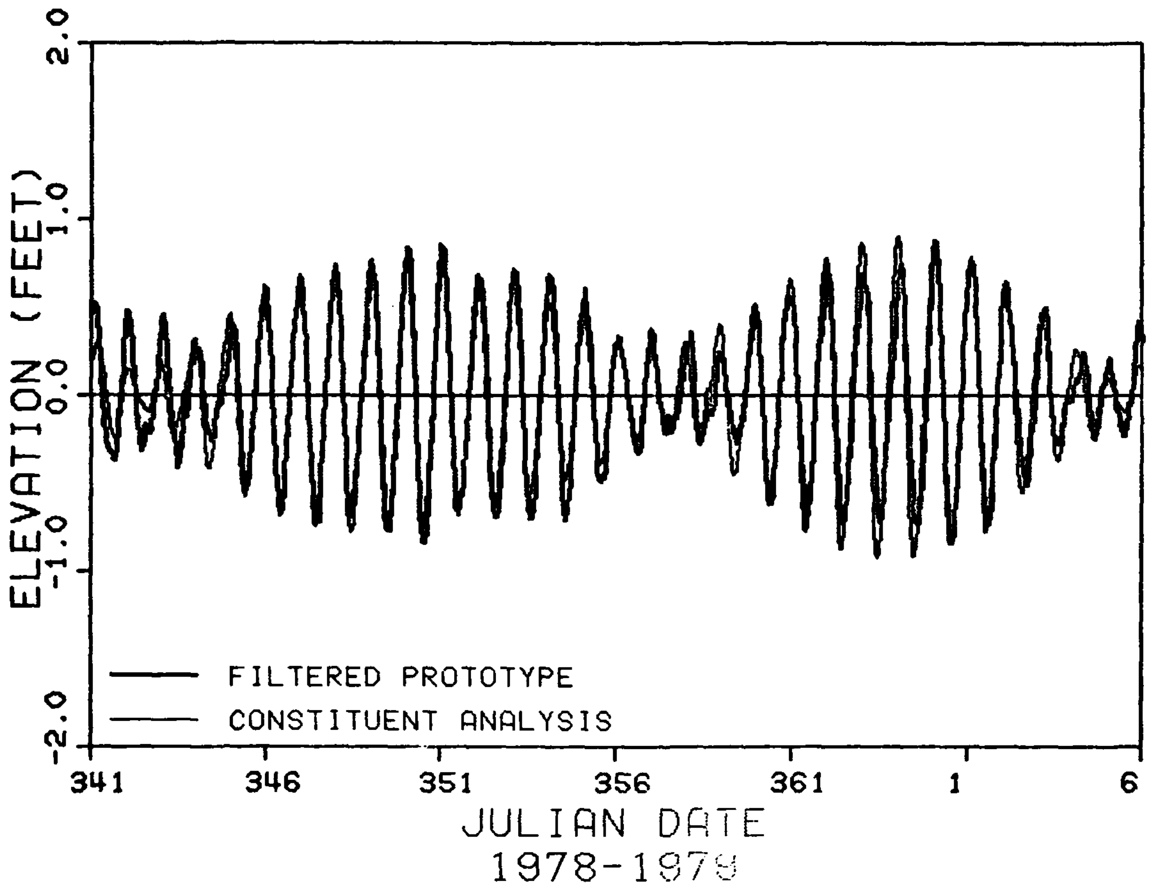
GAGE B-3

DAY 281 TO DAY 311 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-3
DAY 311 TO DAY 341 1978

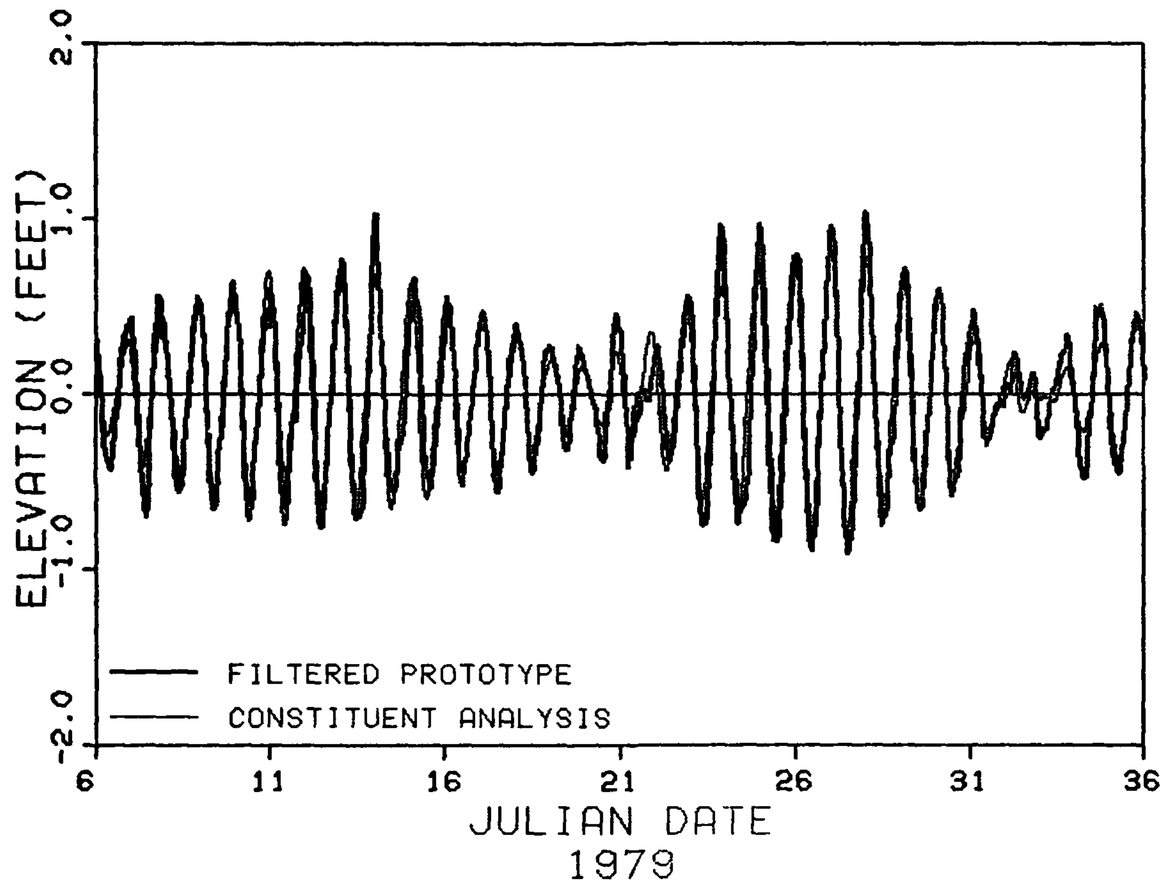


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-3

DAY 341 1978 TO DAY 6 1979

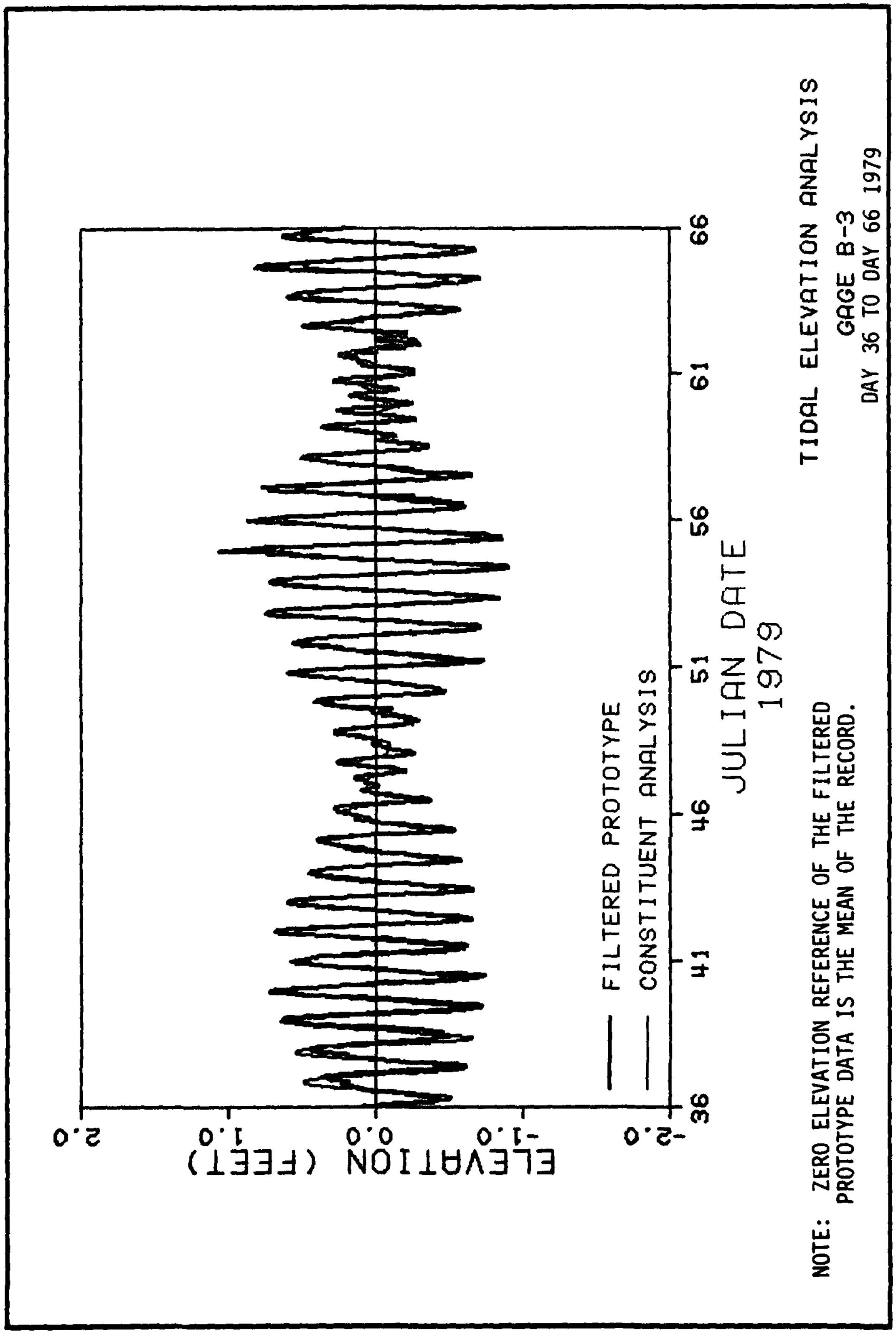


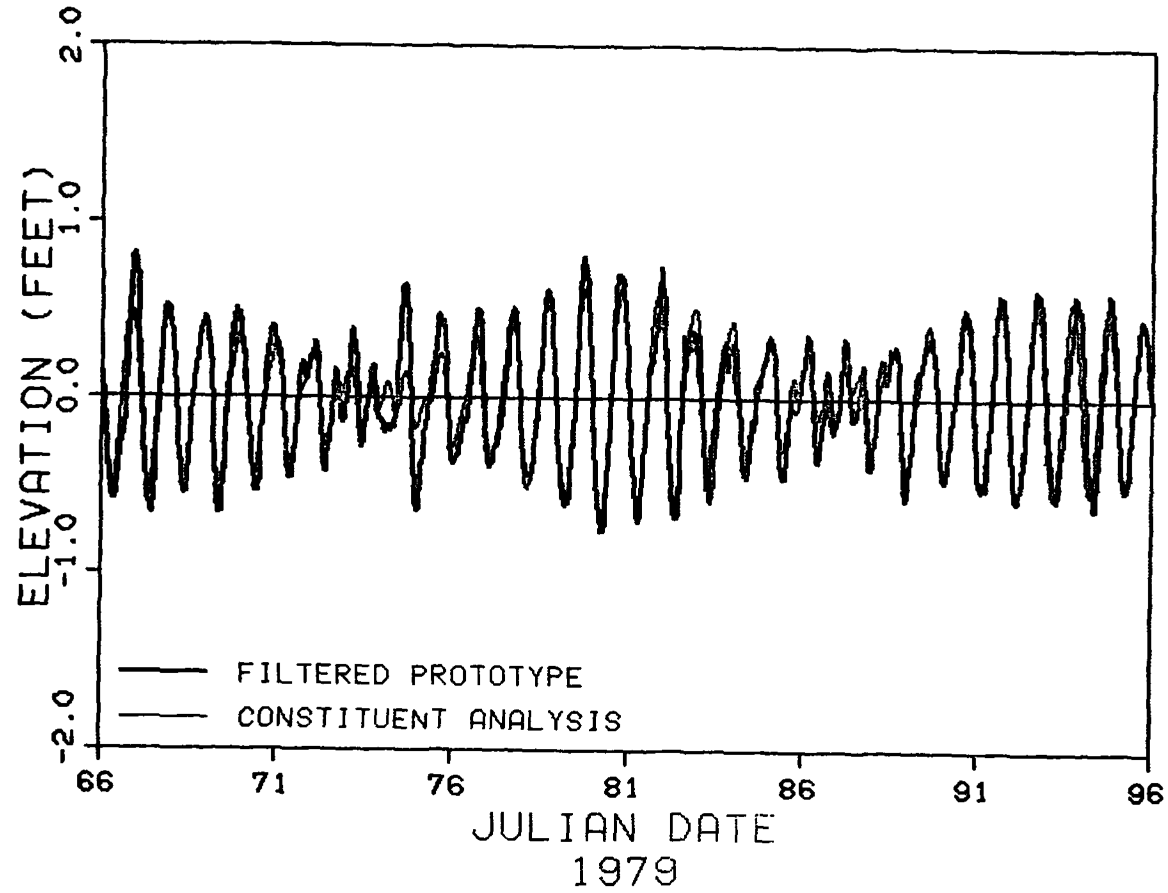
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-3

DAY 6 TO DAY 36 1979


TIDAL ELEVATION ANALYSIS
GAGE B-3
DAY 36 TO DAY 66 1979
ELEVATION (FEET)
2.0
1.0
0.0
-1.0
-2.0
36
41
46
51
56
61
66
JULIAN DATE
1979
FILTERED PROTOTYPE
CONSTITUENT ANALYSIS
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

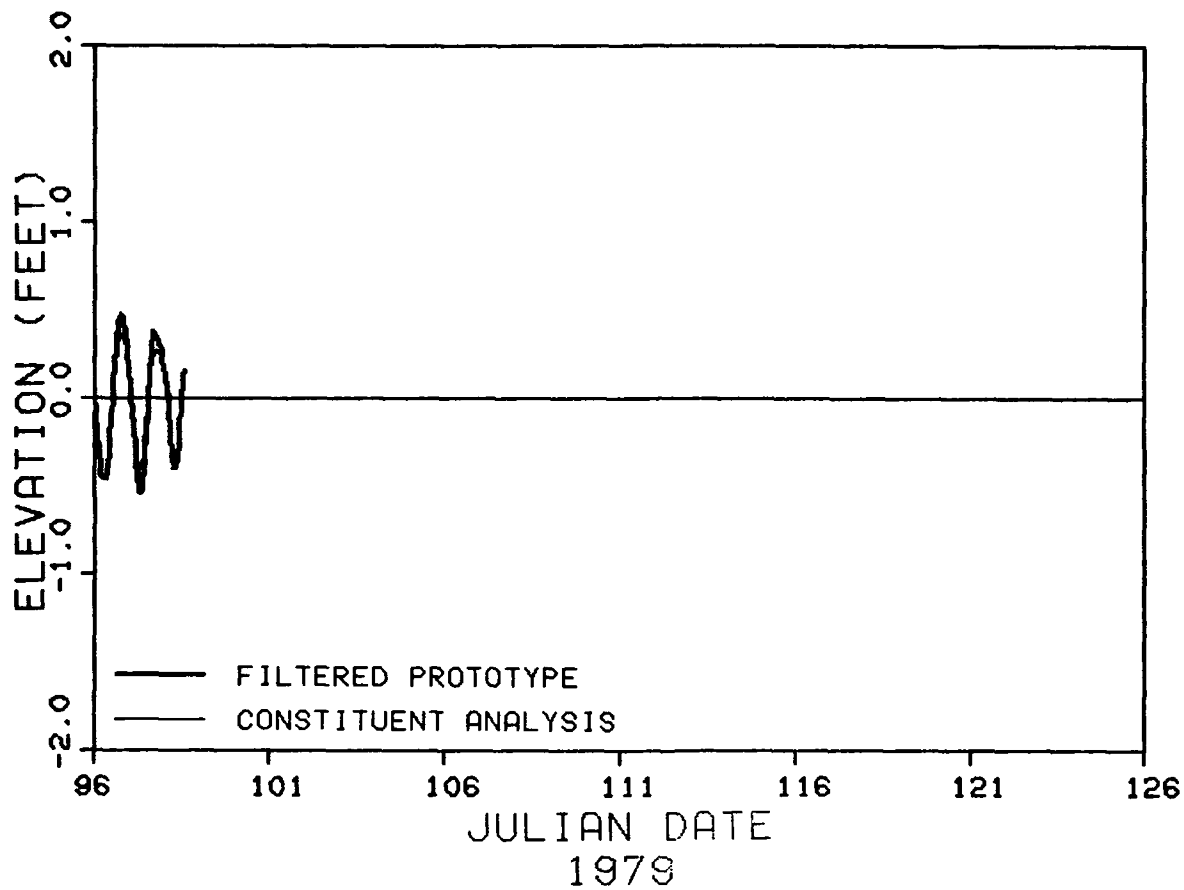


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-3

DAY 66 TO DAY 96 1979

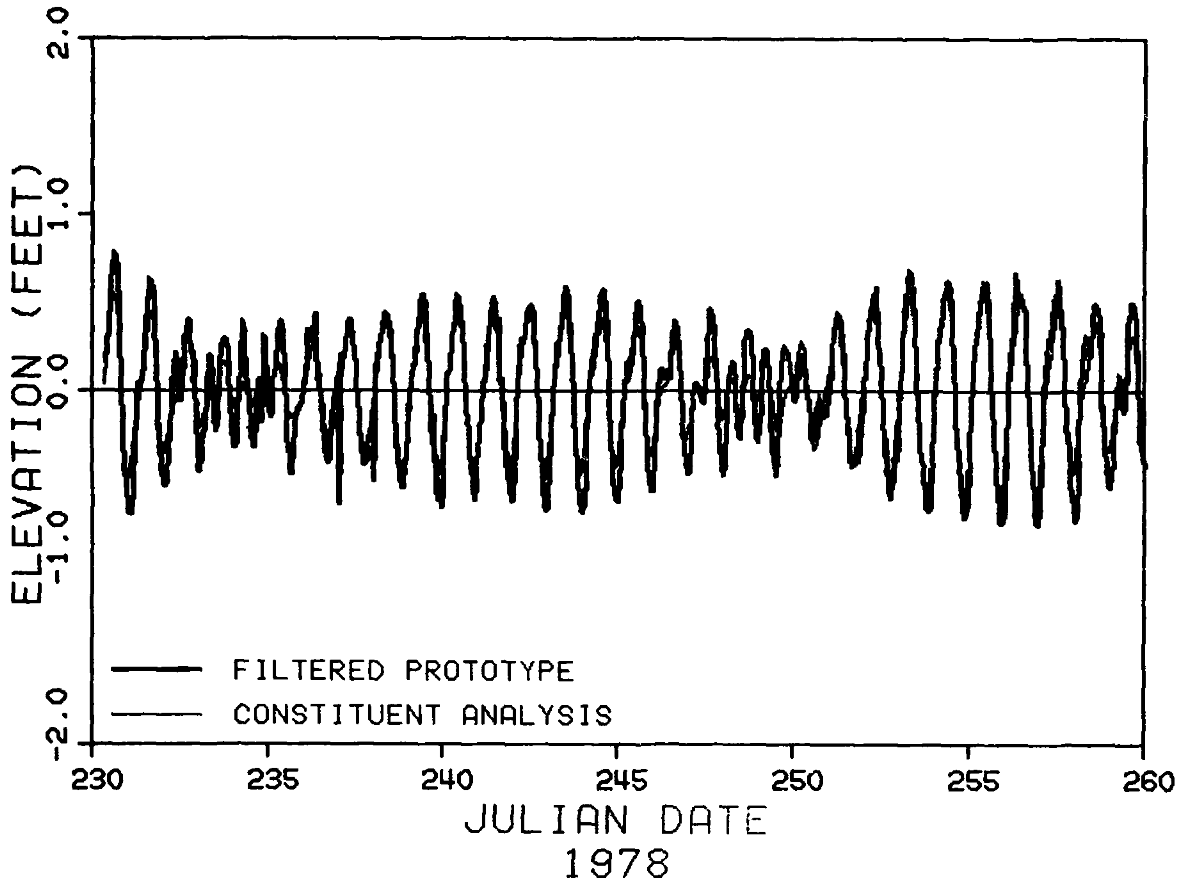


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-3

DAY 96 TO DAY 126 1979

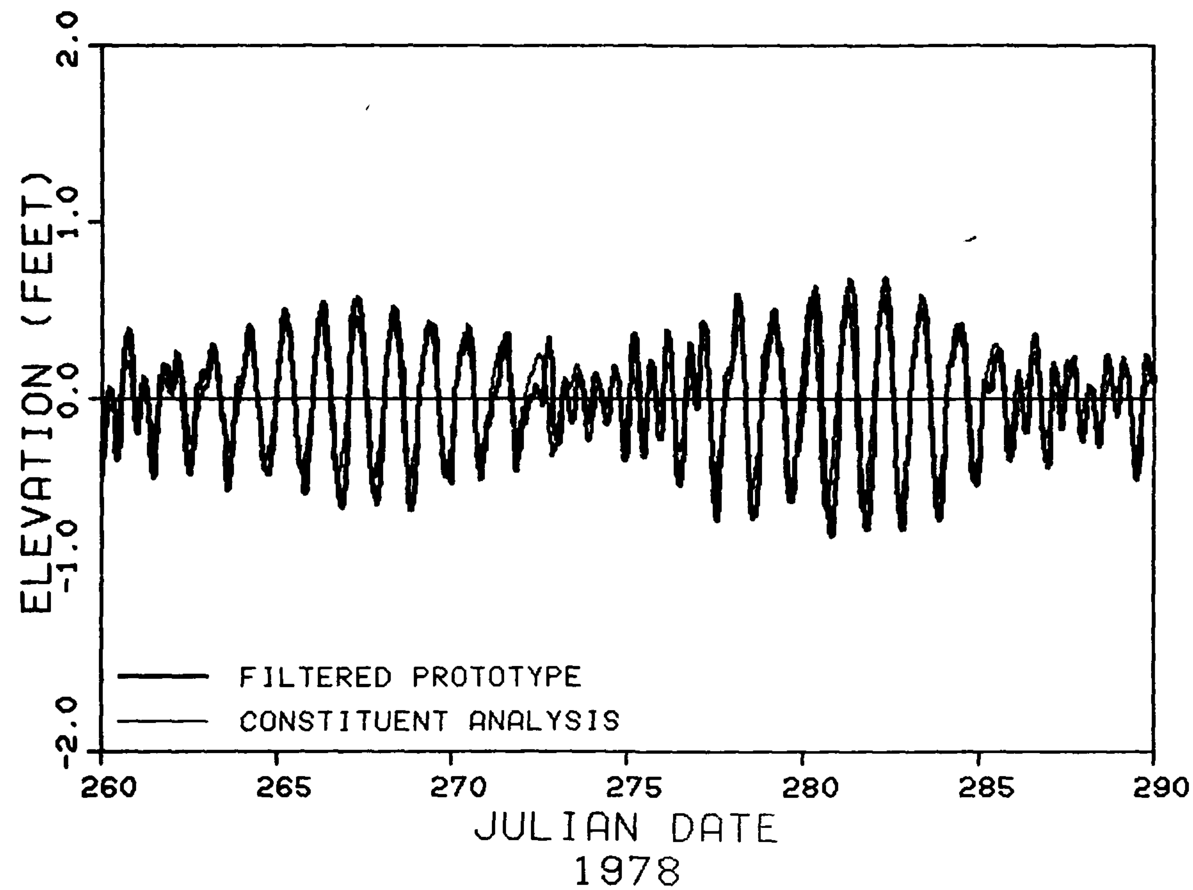


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-4

DAY 230 TO DAY 260 1978

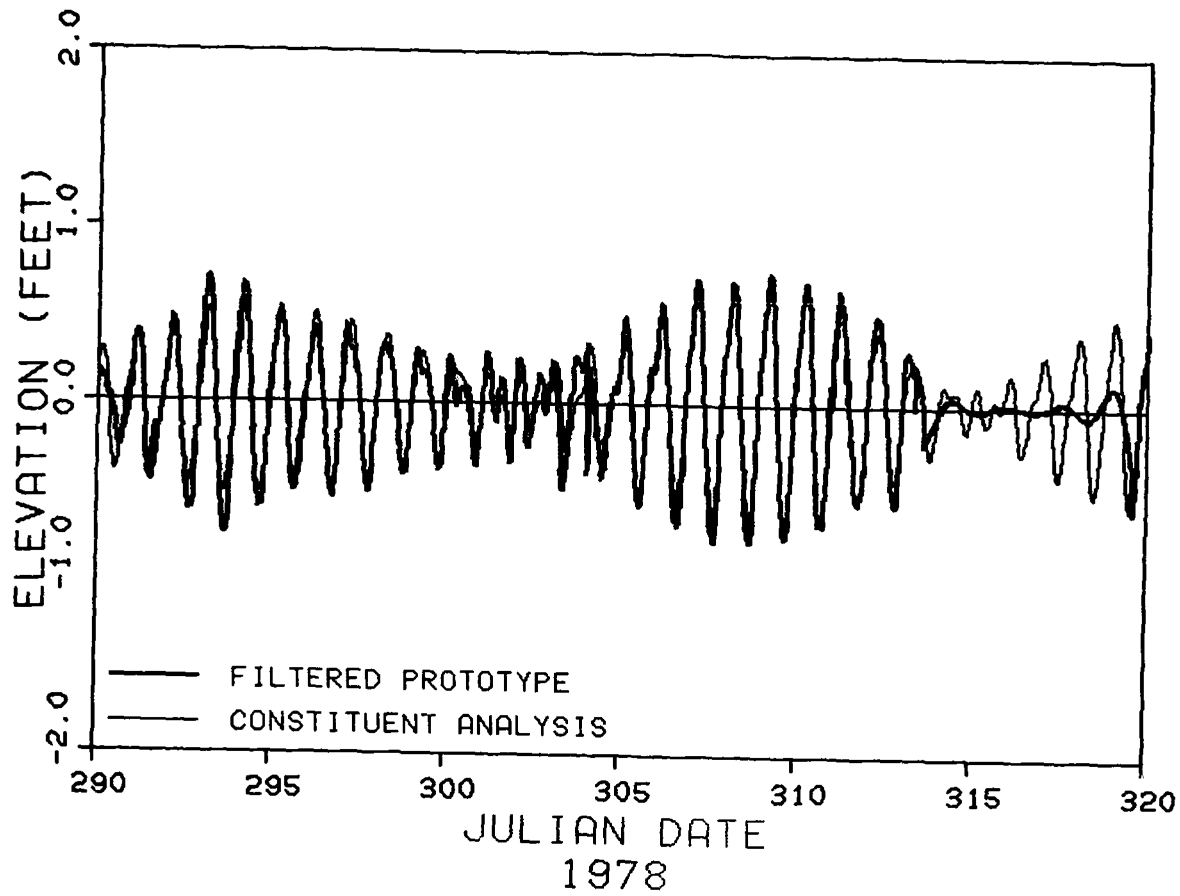


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-4

DAY 260 TO DAY 290 1978

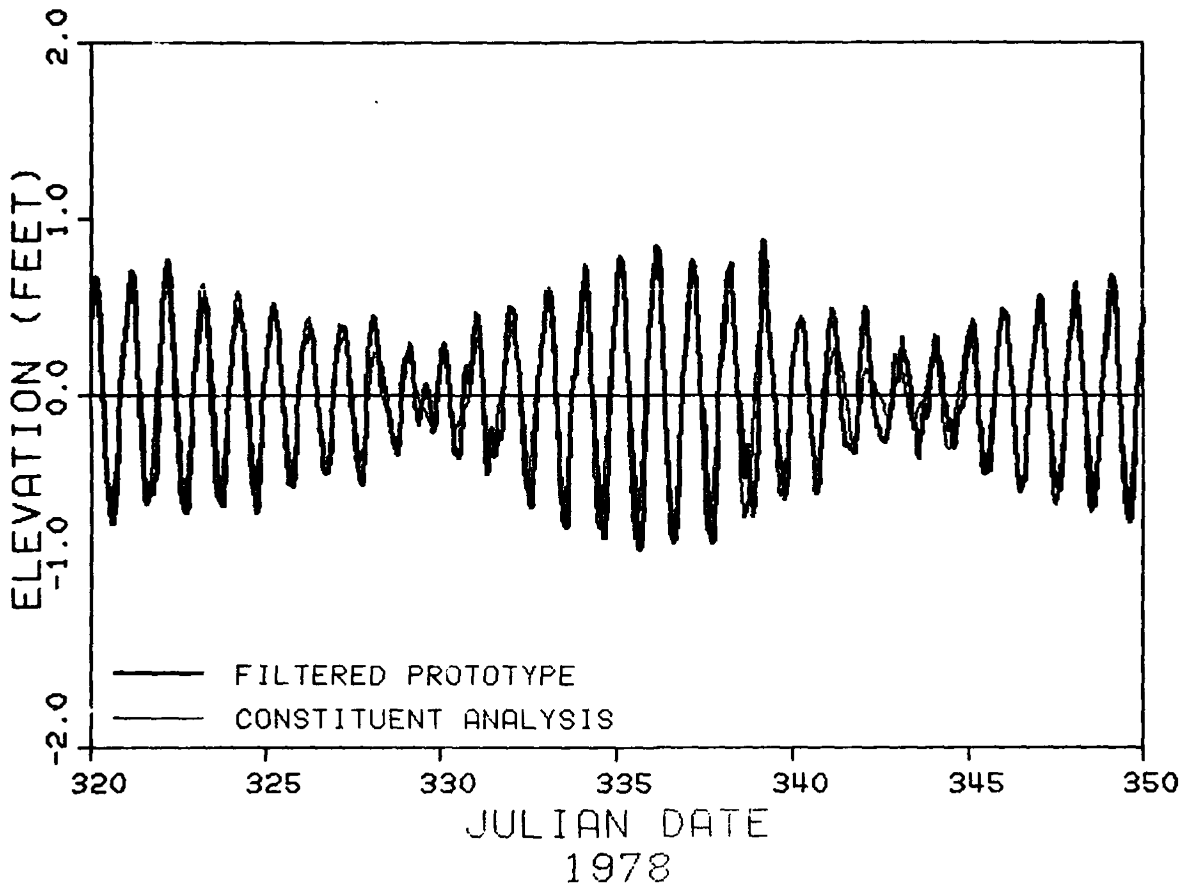


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

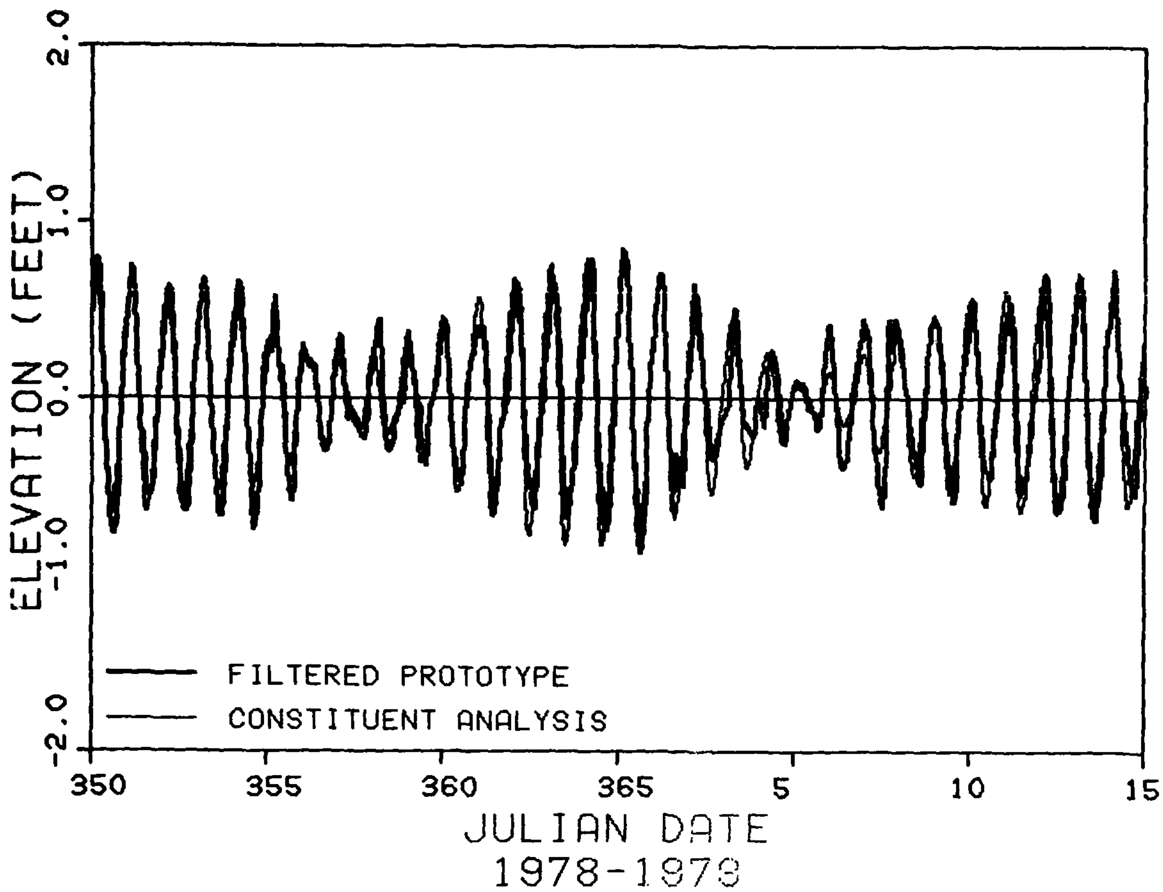
GAGE B-4

DAY 290 TO DAY 320 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-4
DAY 320 TO DAY 350 1978

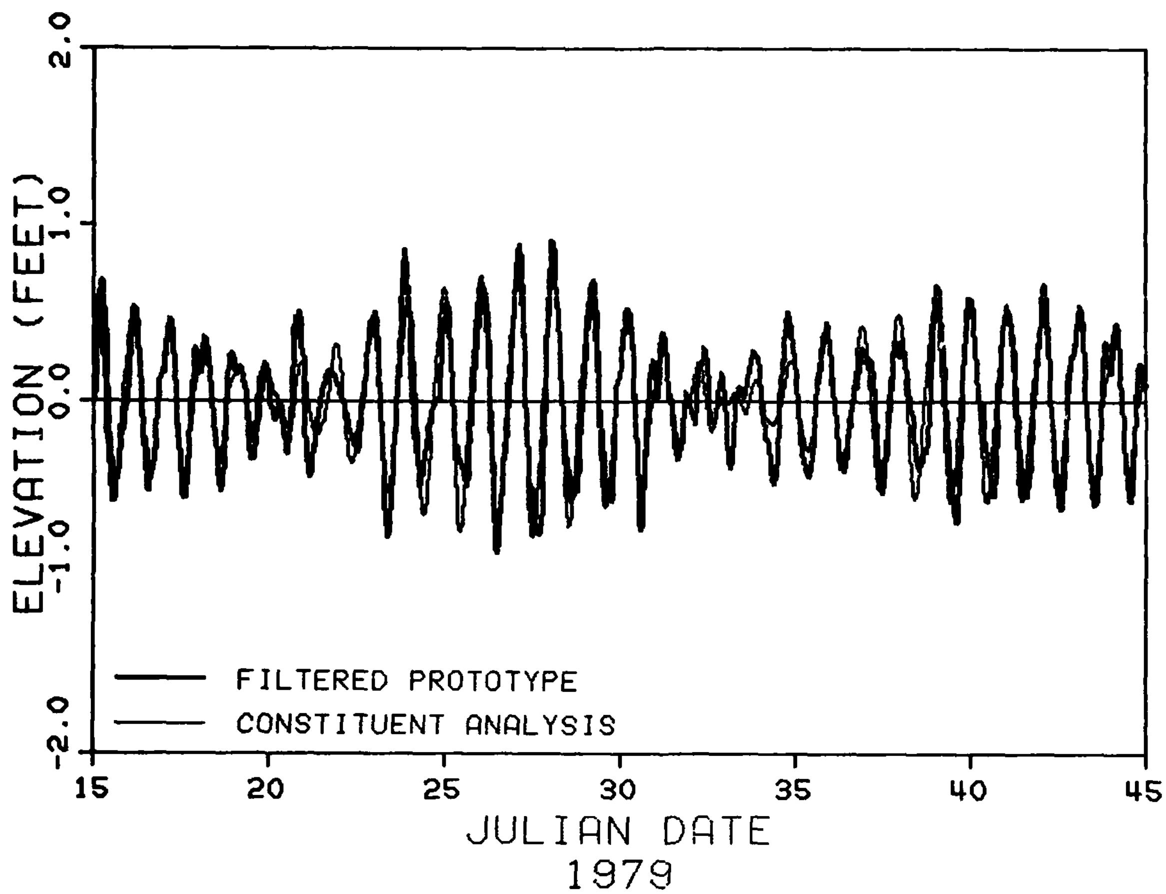


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

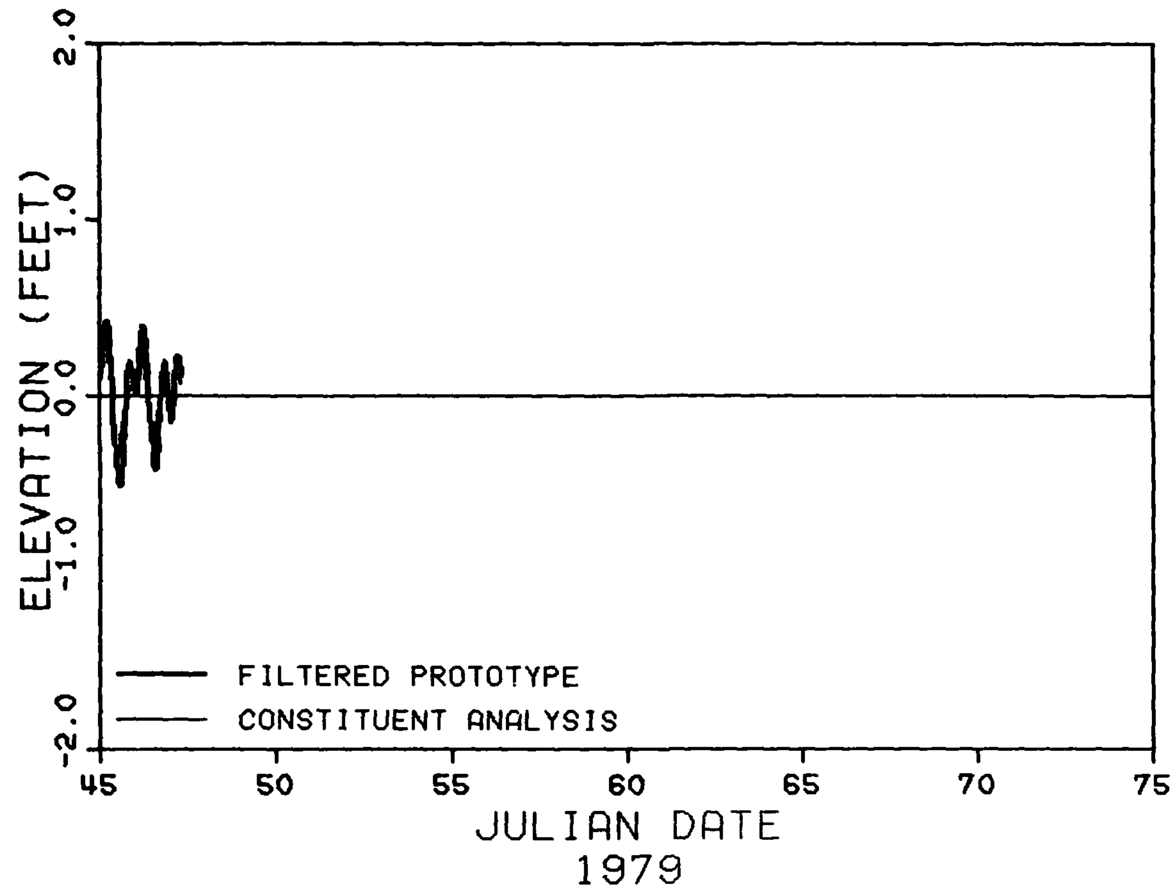
GAGE B-4

DAY 350 1978 TO DAY 15 1979



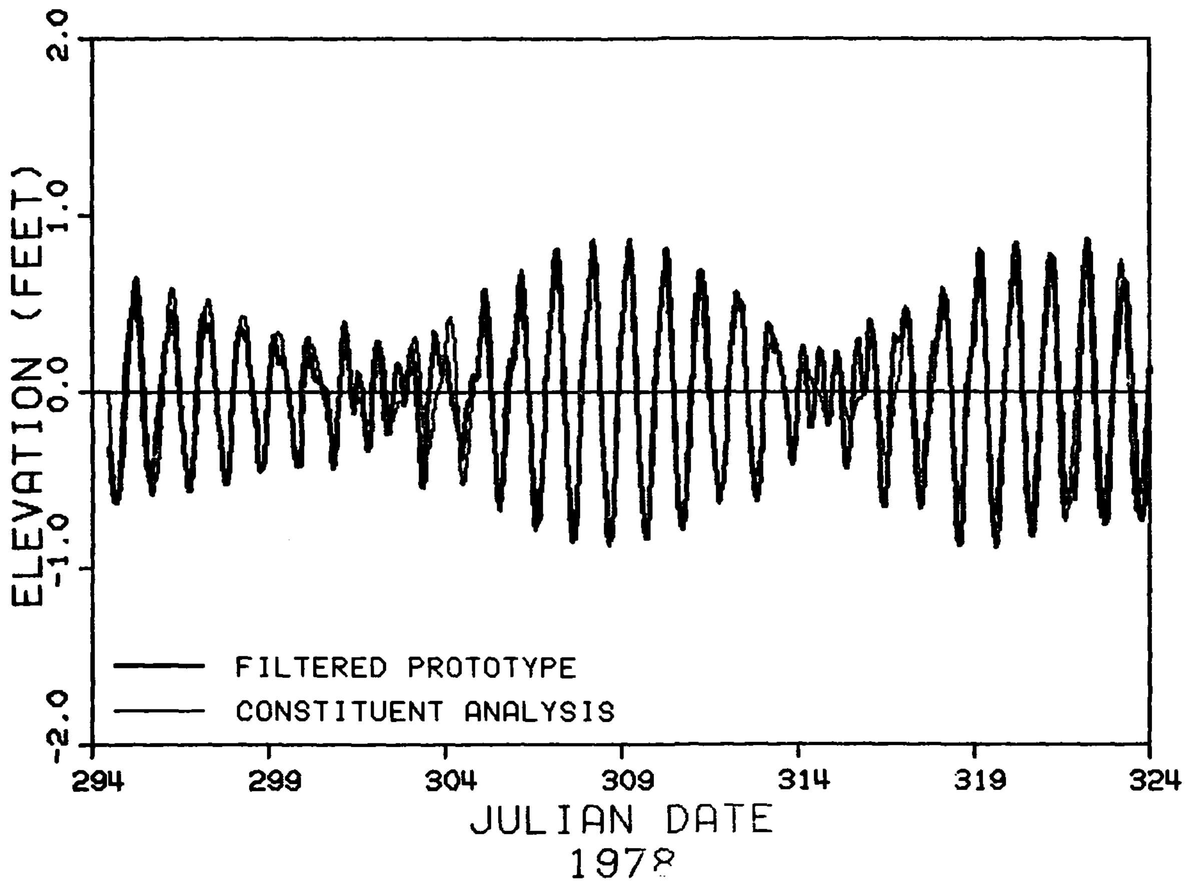
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-4
DAY 15 TO DAY 45 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-4
DAY 45 TO DAY 75 1979

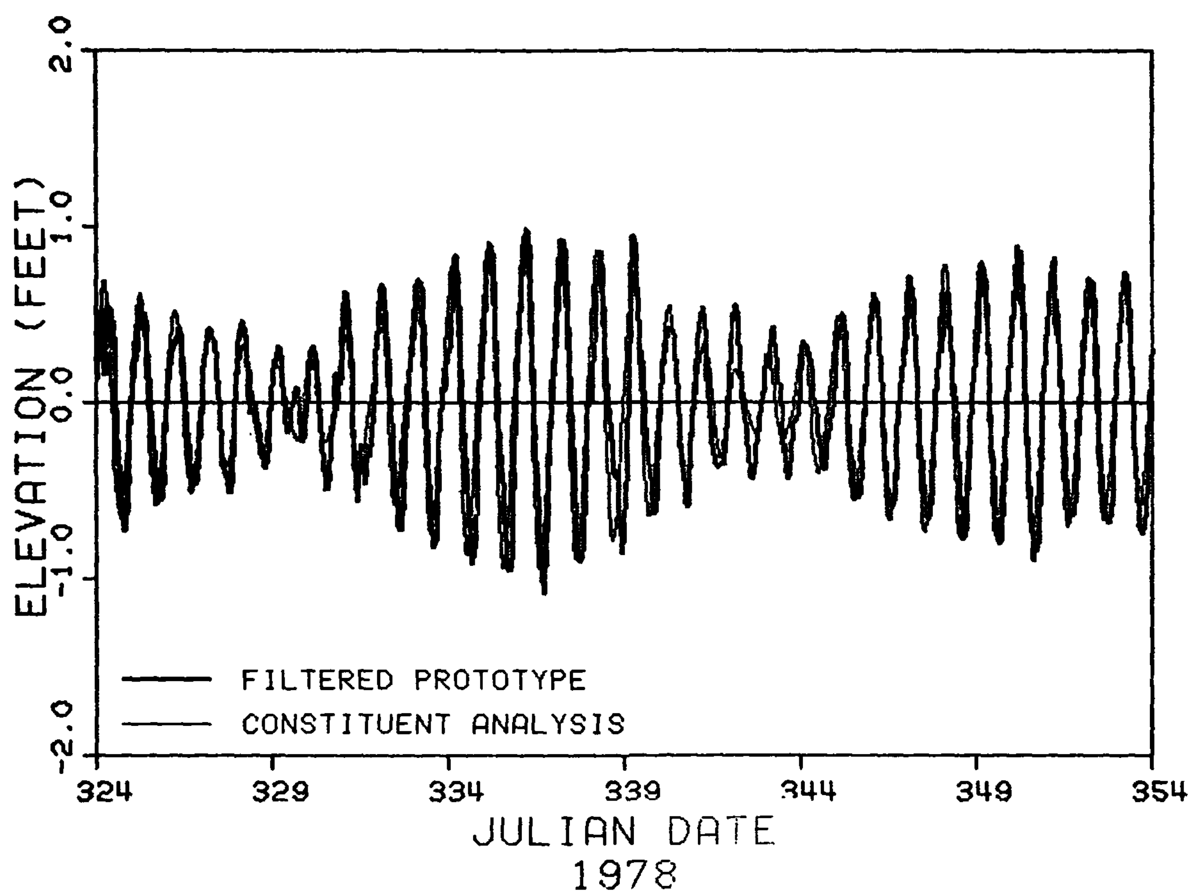


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

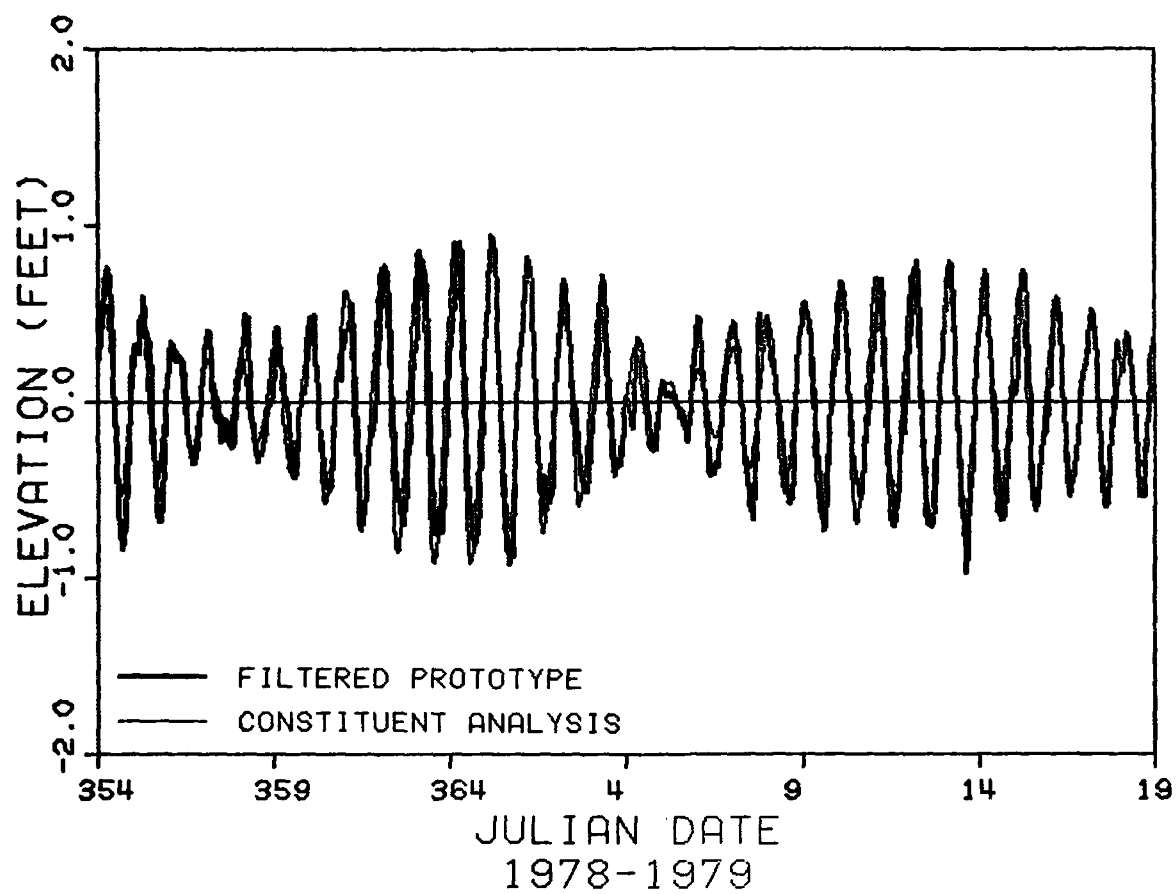
GAGE B-5

DAY 294 TO DAY 324 1978



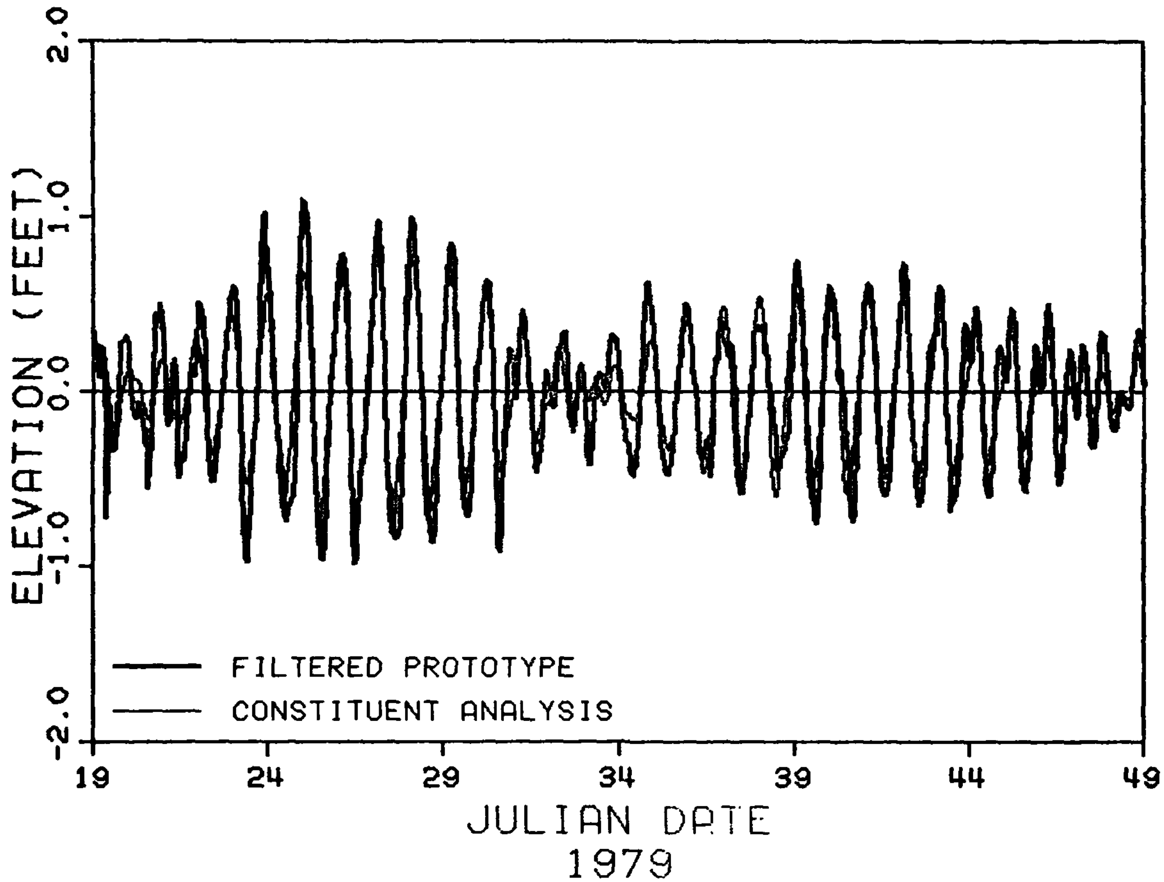
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-5
DAY 324 TO DAY 354 1978



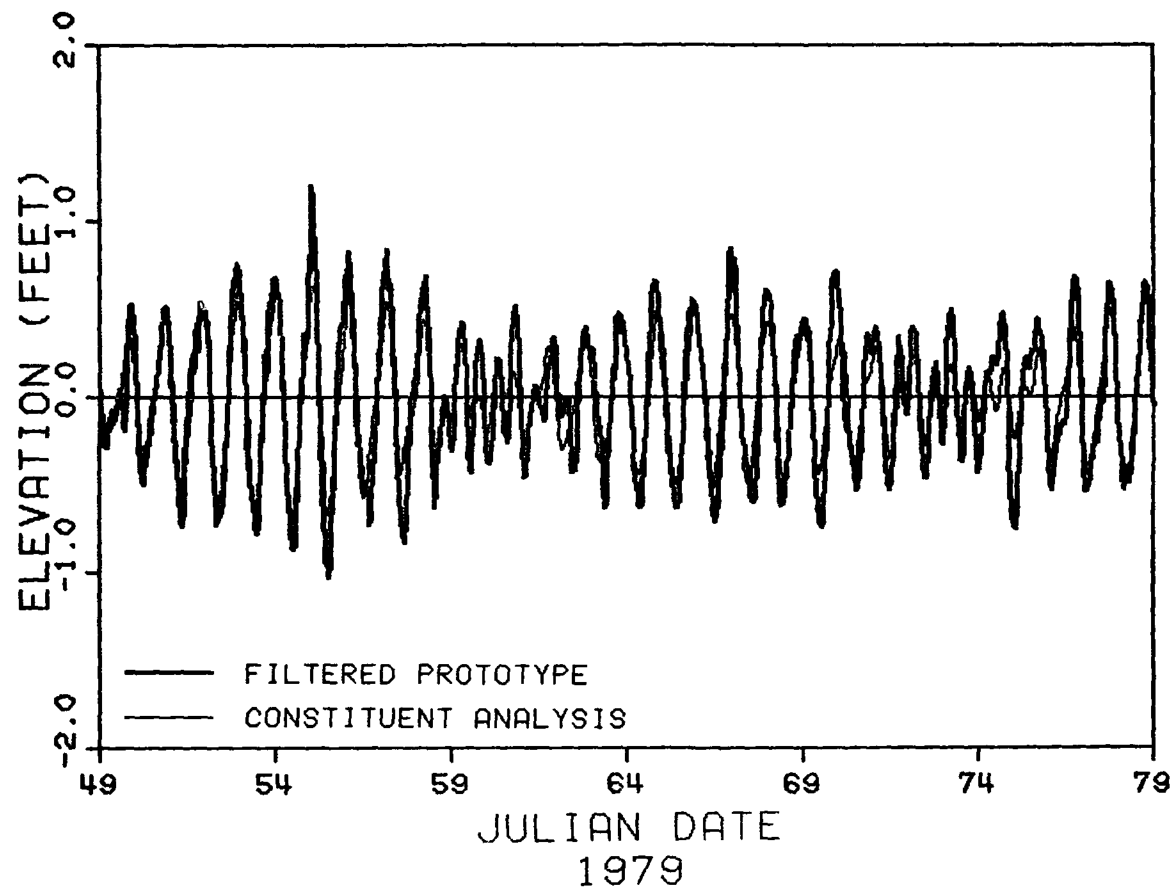
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-5
DAY 354 1978 TO DAY 19 1979



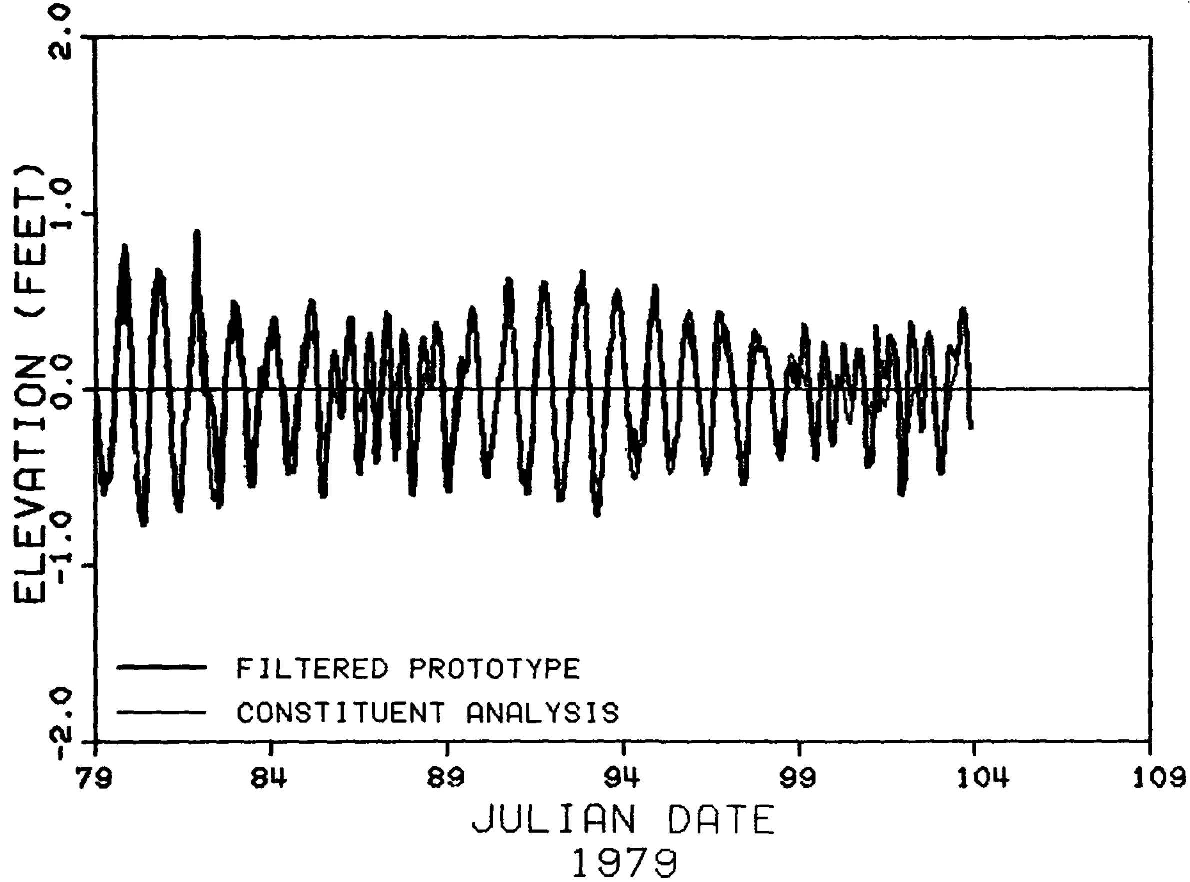
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-5
DAY 19 TO DAY 49 1979



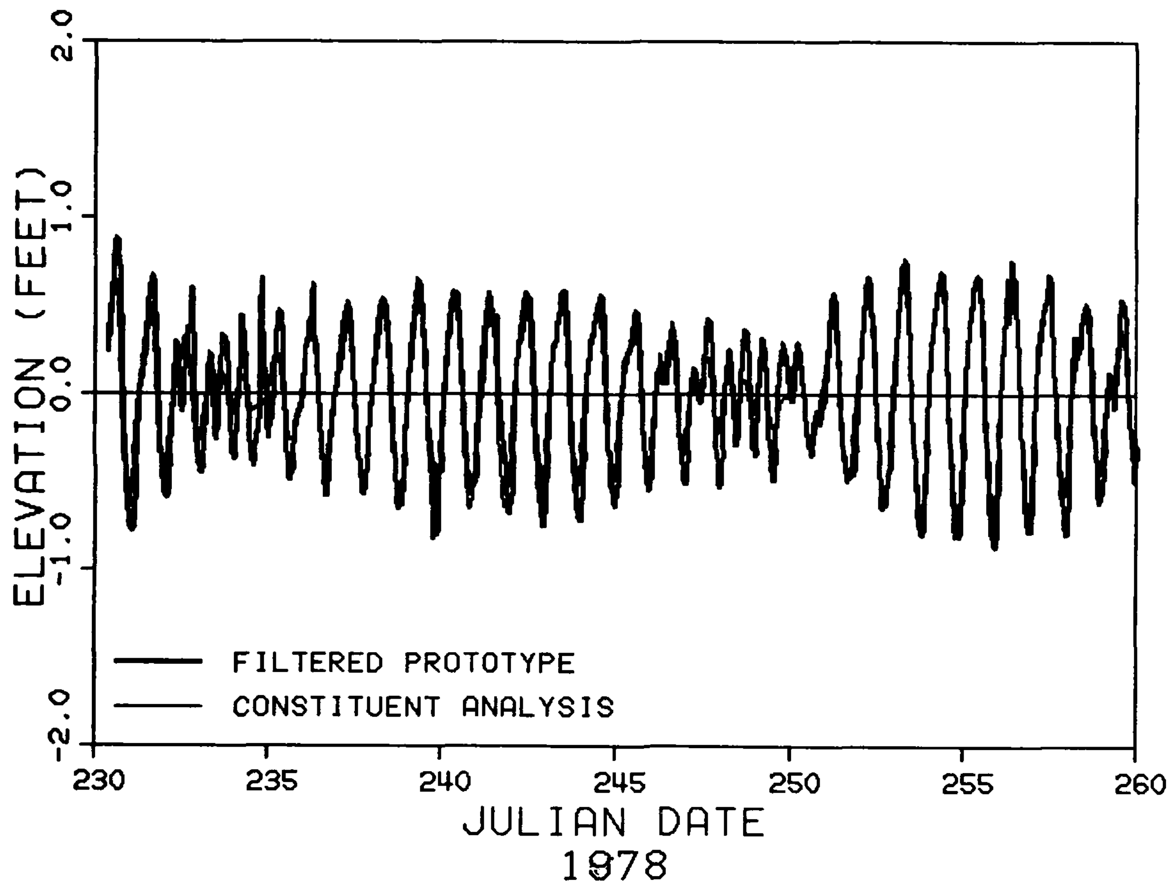
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-5
DAY 49 TO DAY 79 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-5
DAY 79 TO DAY 109 1979

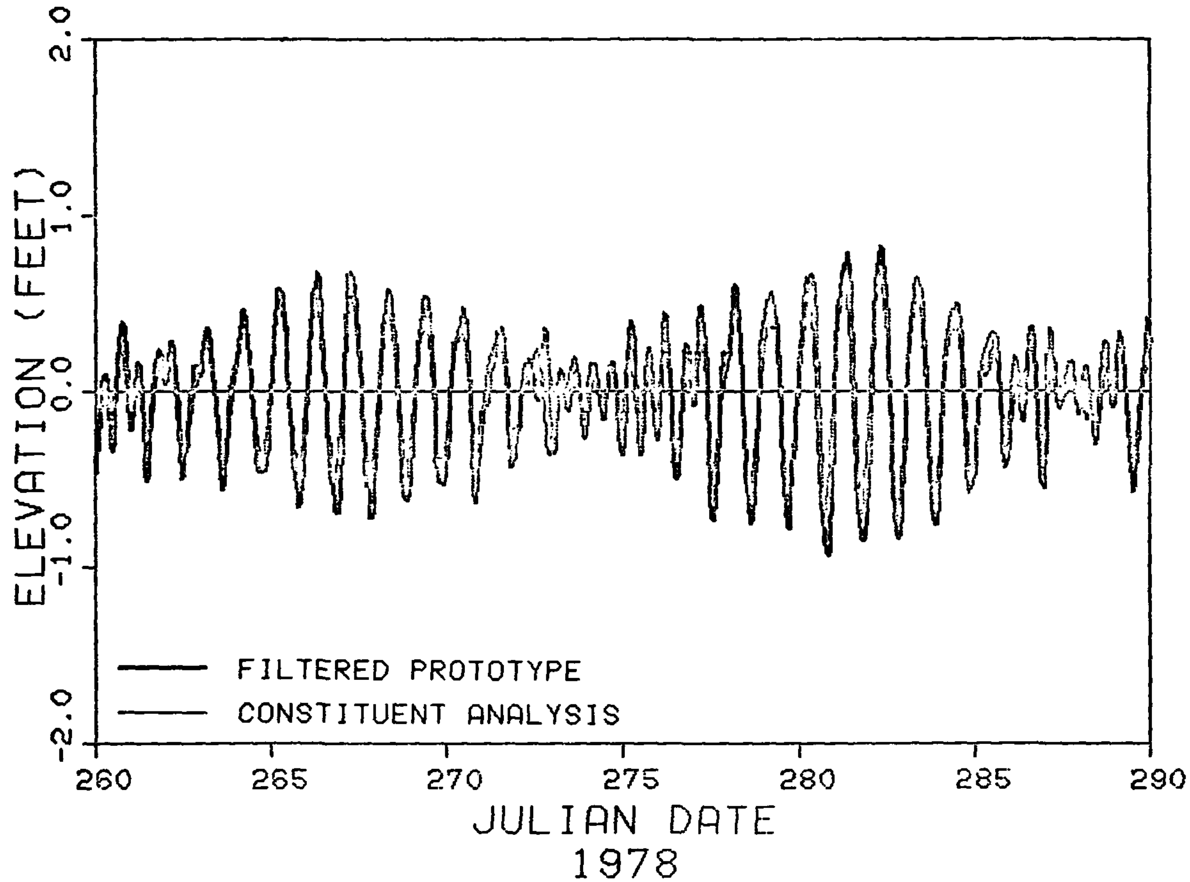


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-6

DAY 290 TO DAY 260 1978

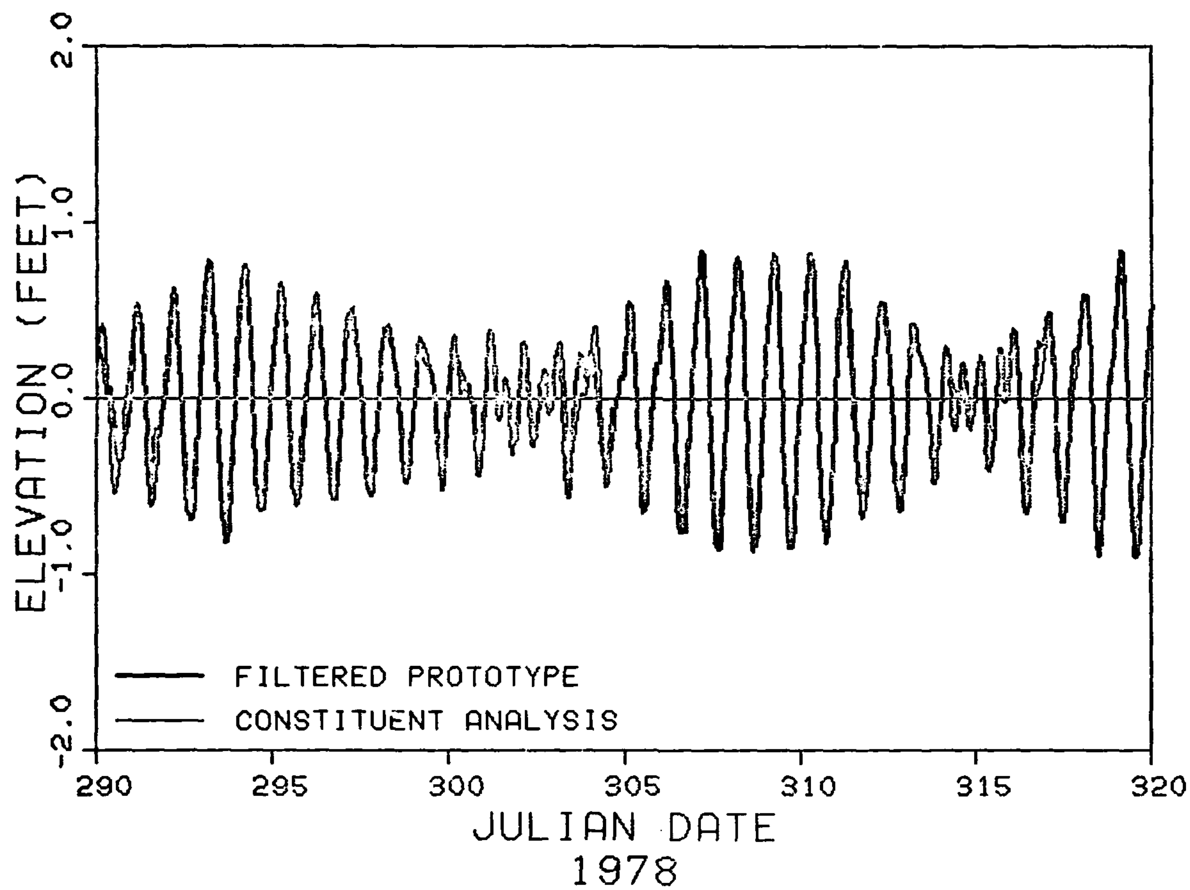


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE B-6

DAY 260 TO DAY 290 1978

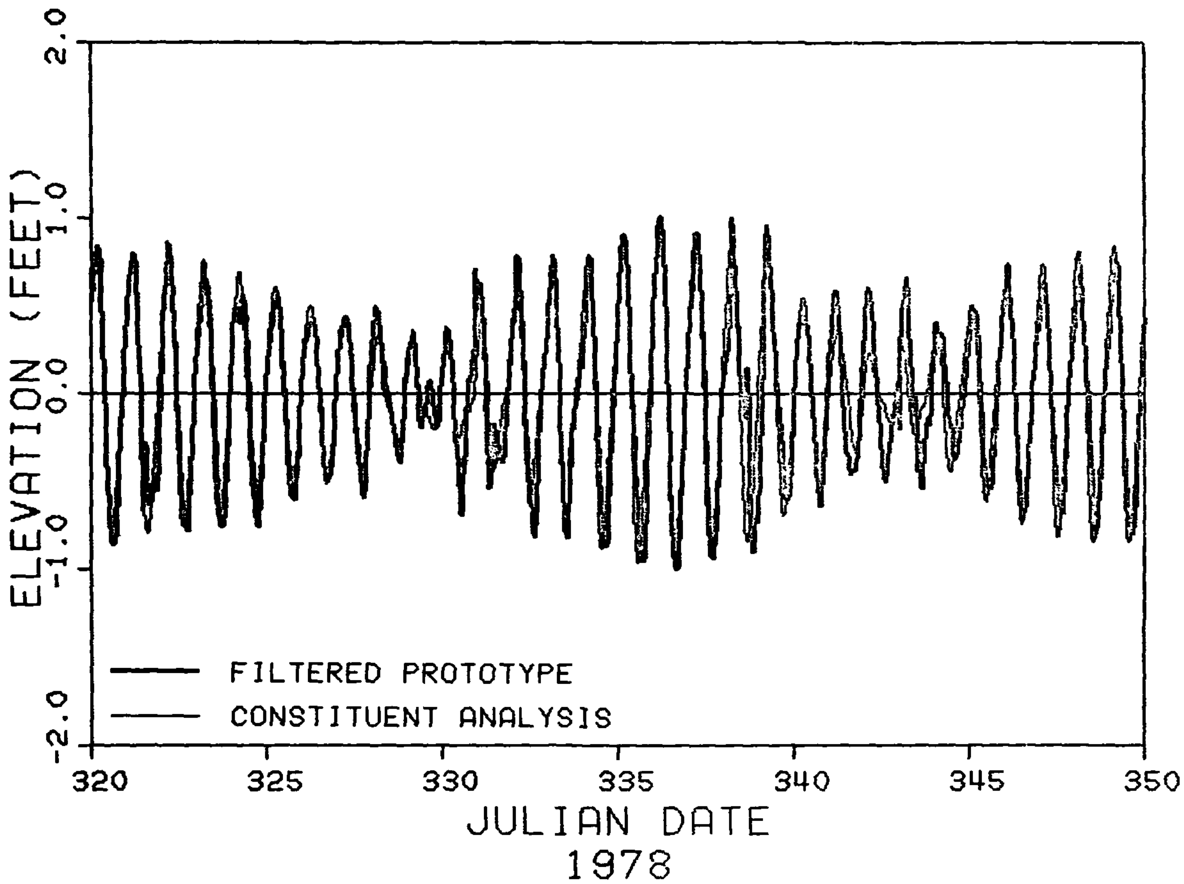


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

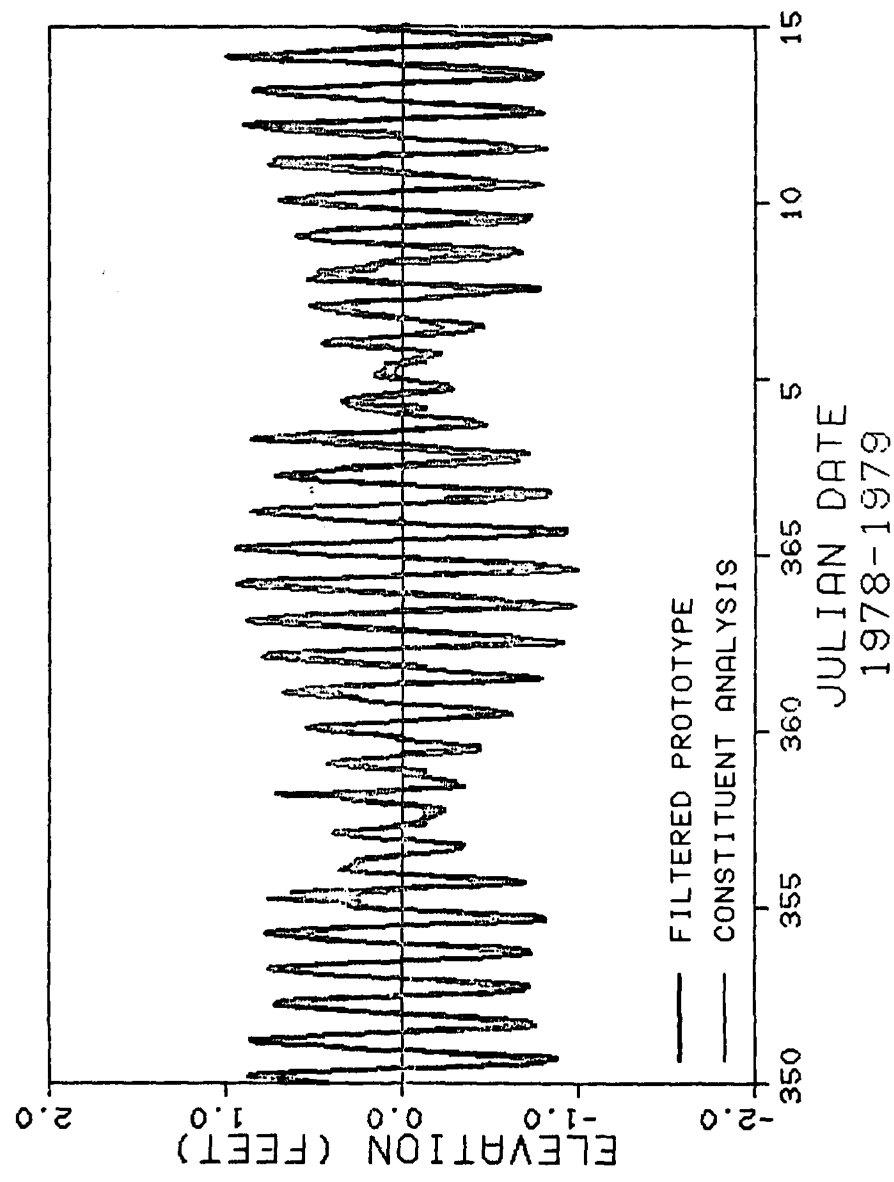
GAGE B-6

DAY 290 TO DAY 320 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

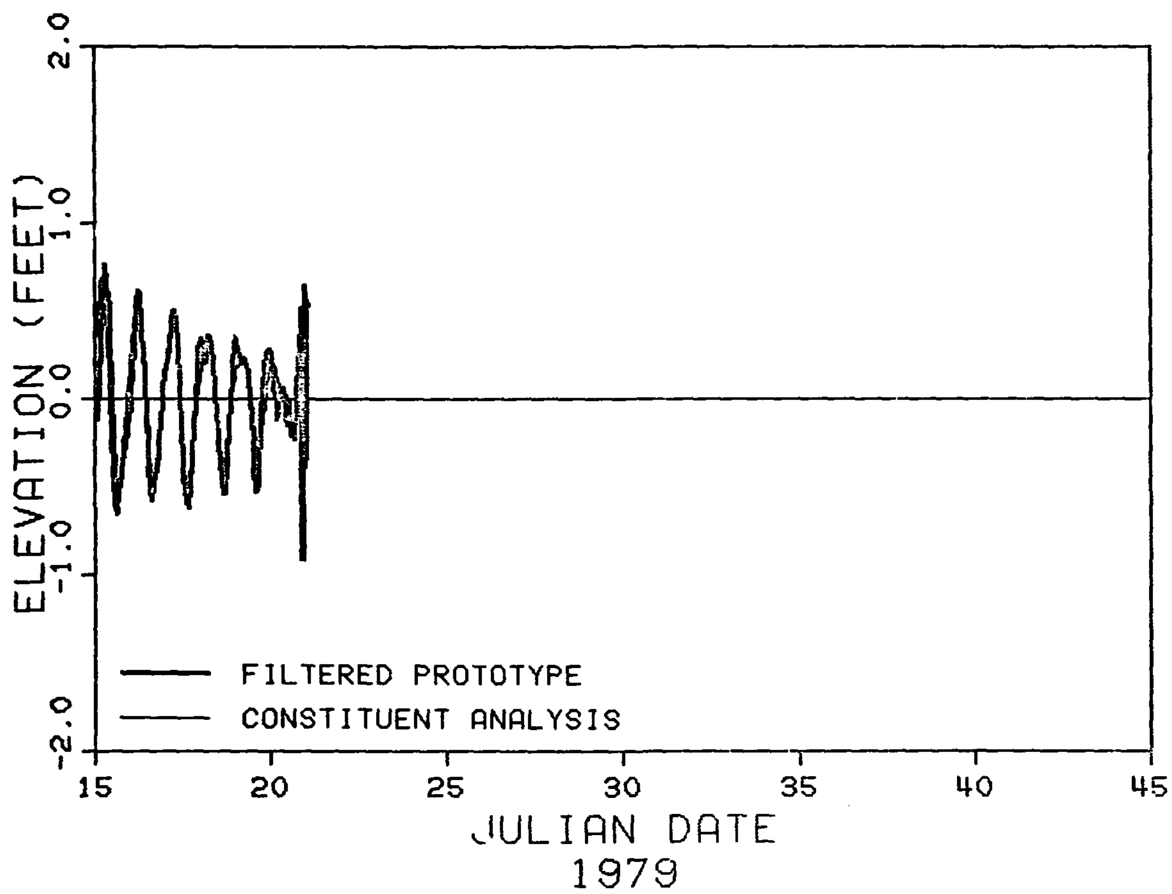
TIDAL ELEVATION ANALYSIS
GAGE B-6
DAY 320 TO DAY 350 1978



TIDAL ELEVATION ANALYSIS
GAGE B-6
DAY 350 1978 TO DAY 15 1979

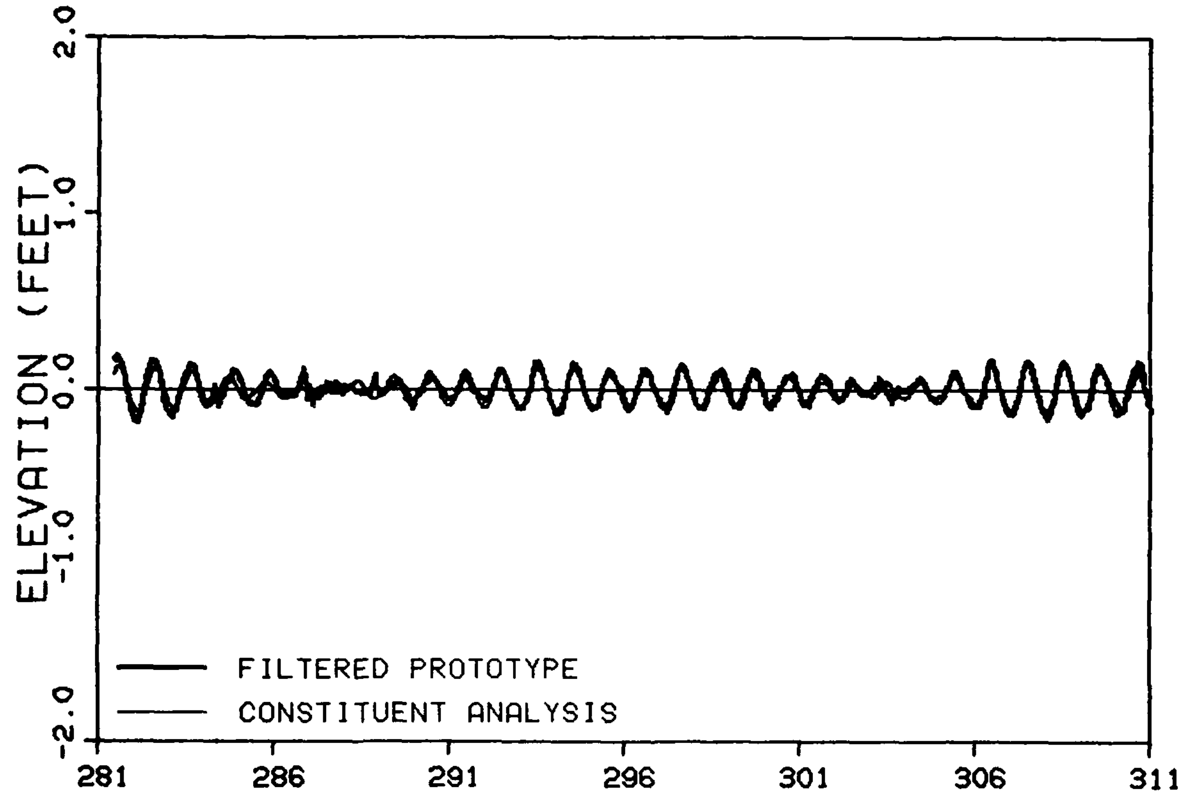
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

PLATE 62



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE B-6
DAY 15 TO DAY 45 1979

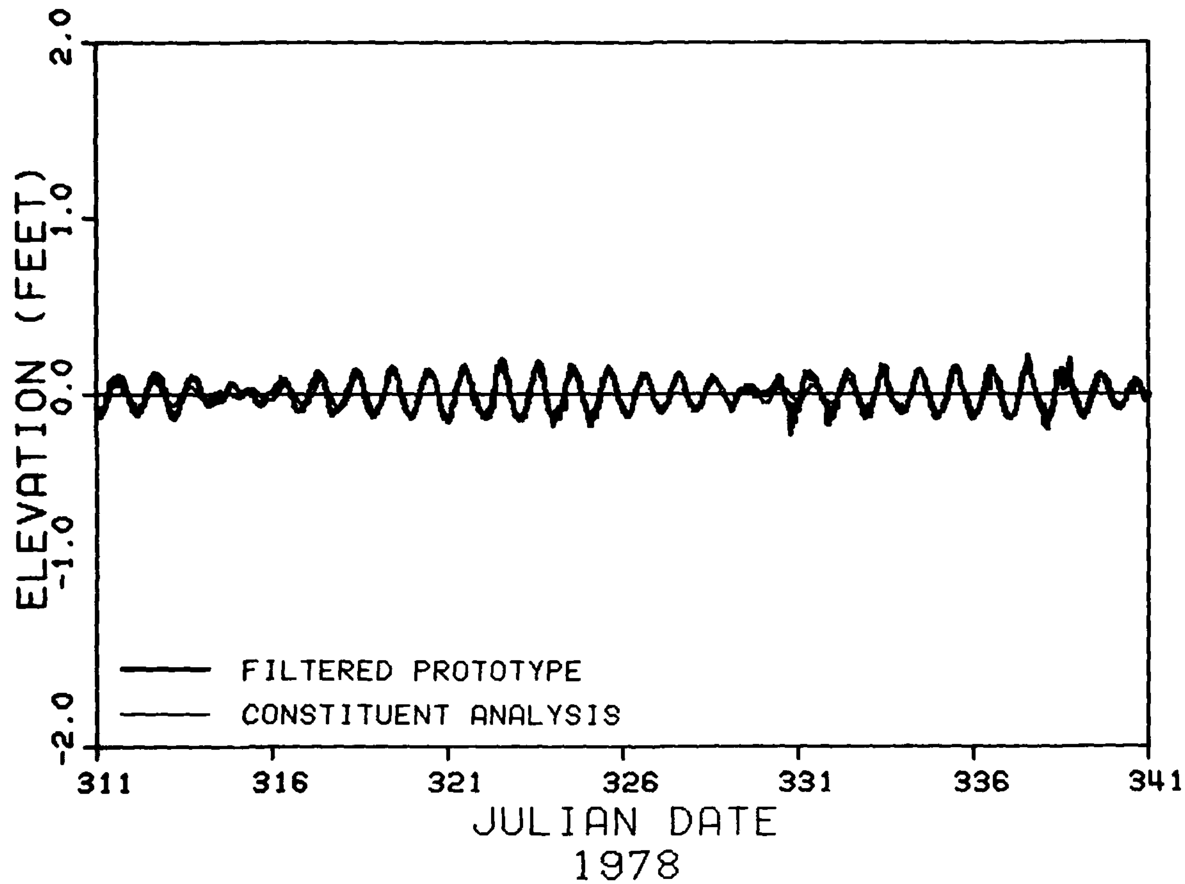


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE M-1

DAY 281 TO DAY 311 1978

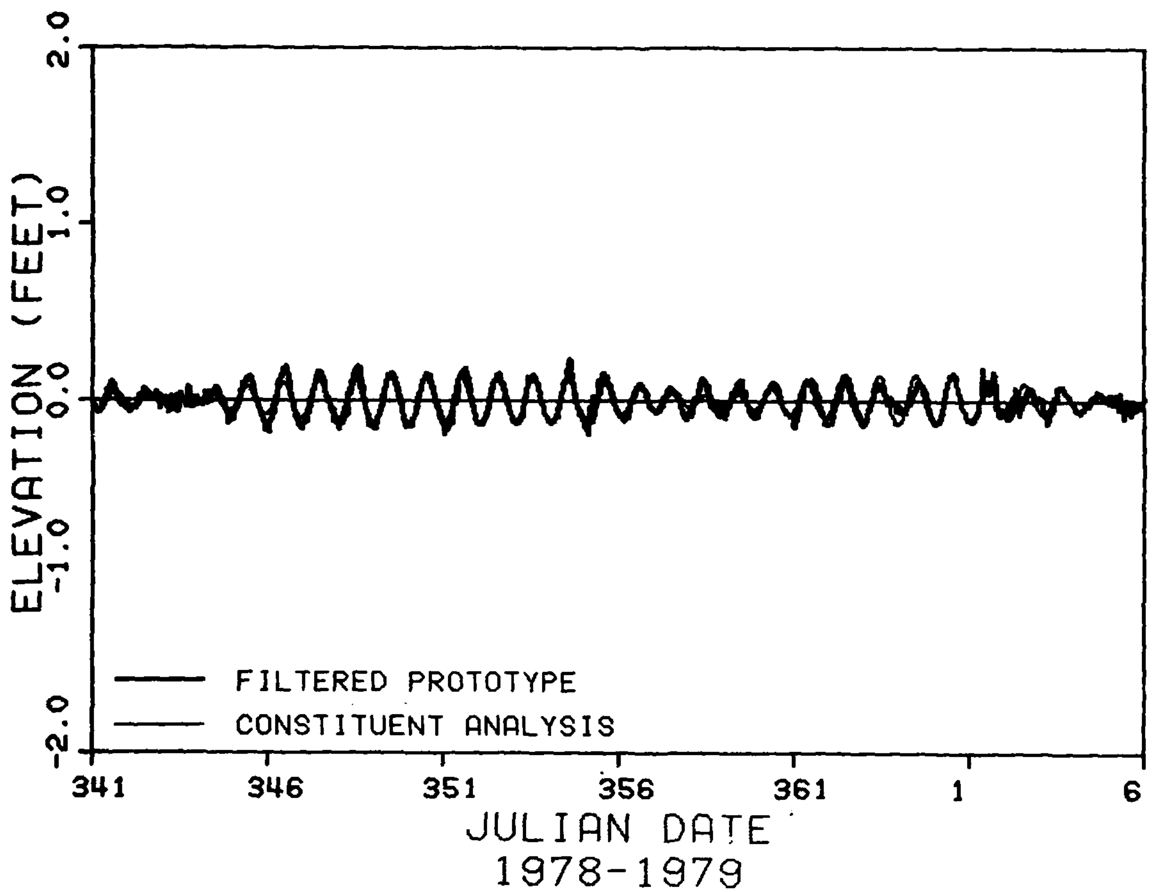


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE M-1

DAY 311 TO DAY 341 1978

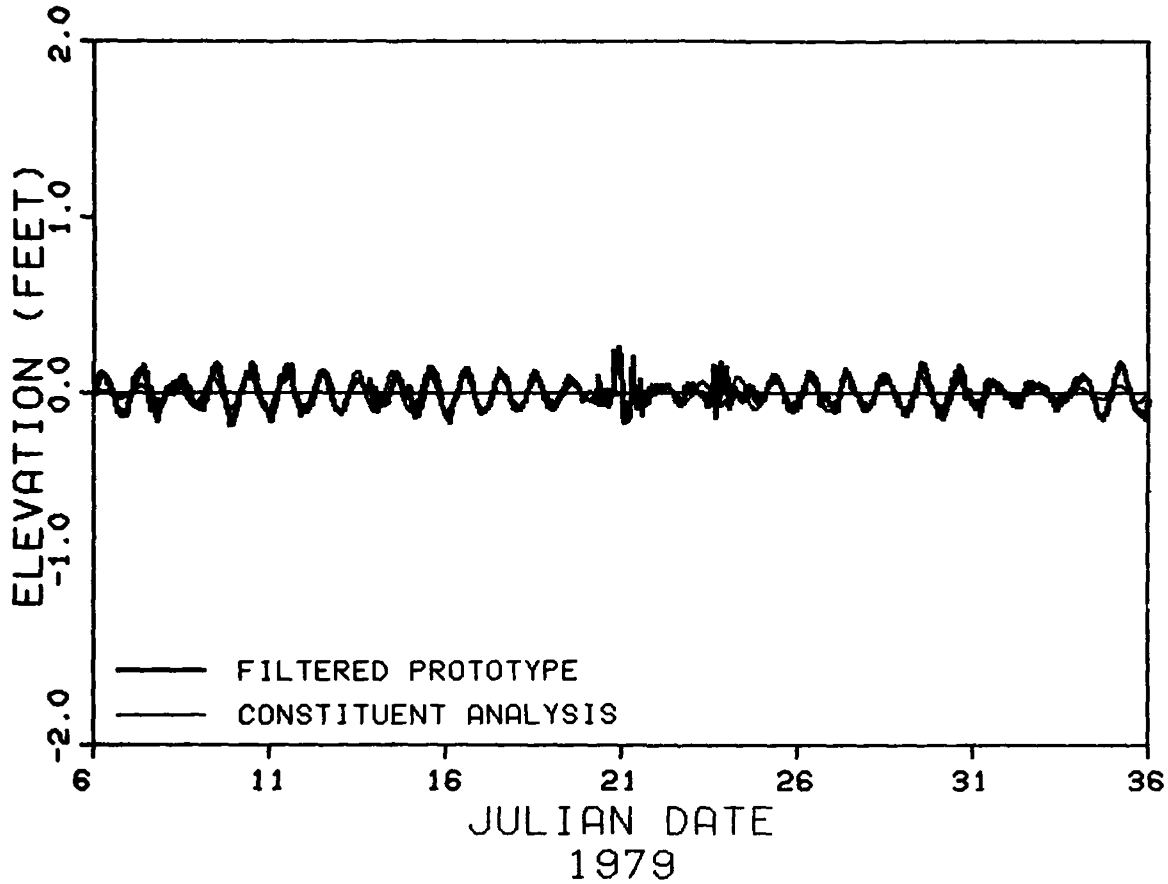


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE M-1

DAY 341 1978 TO DAY 6 1979

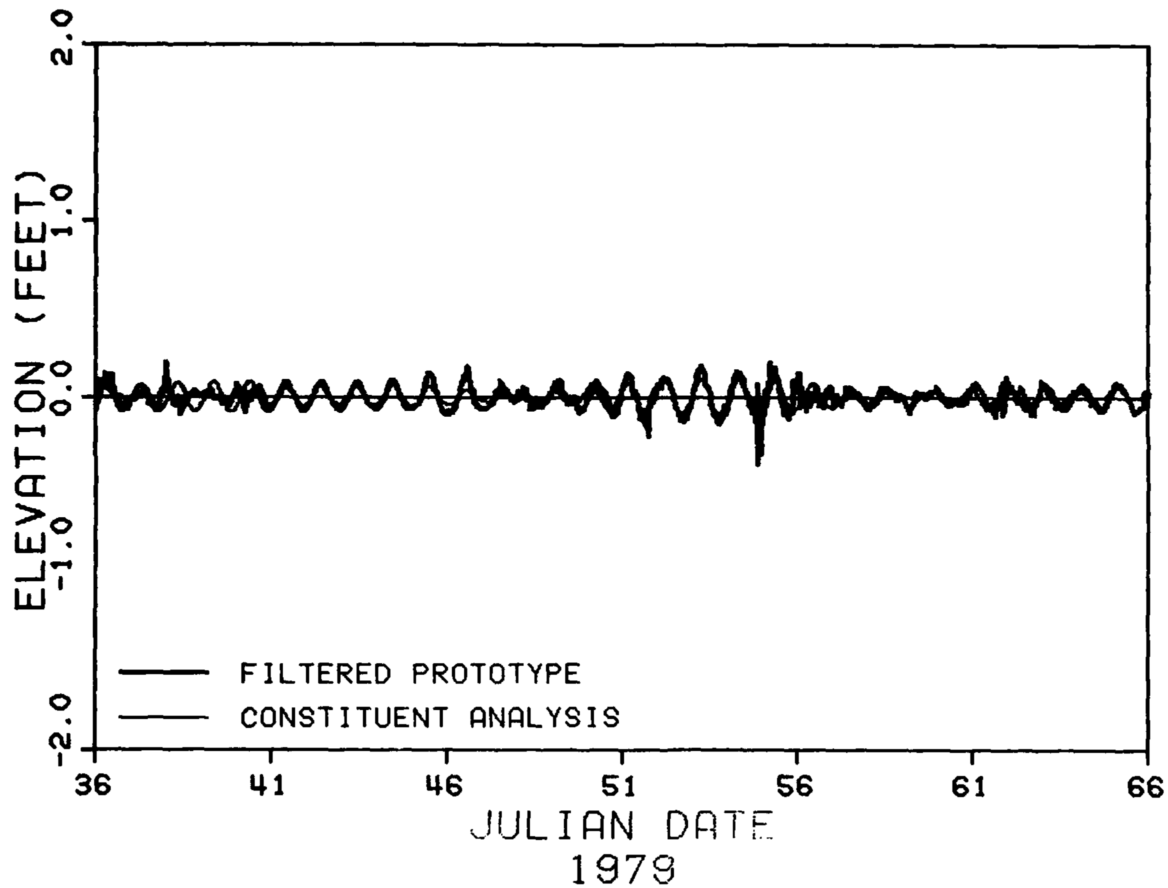


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

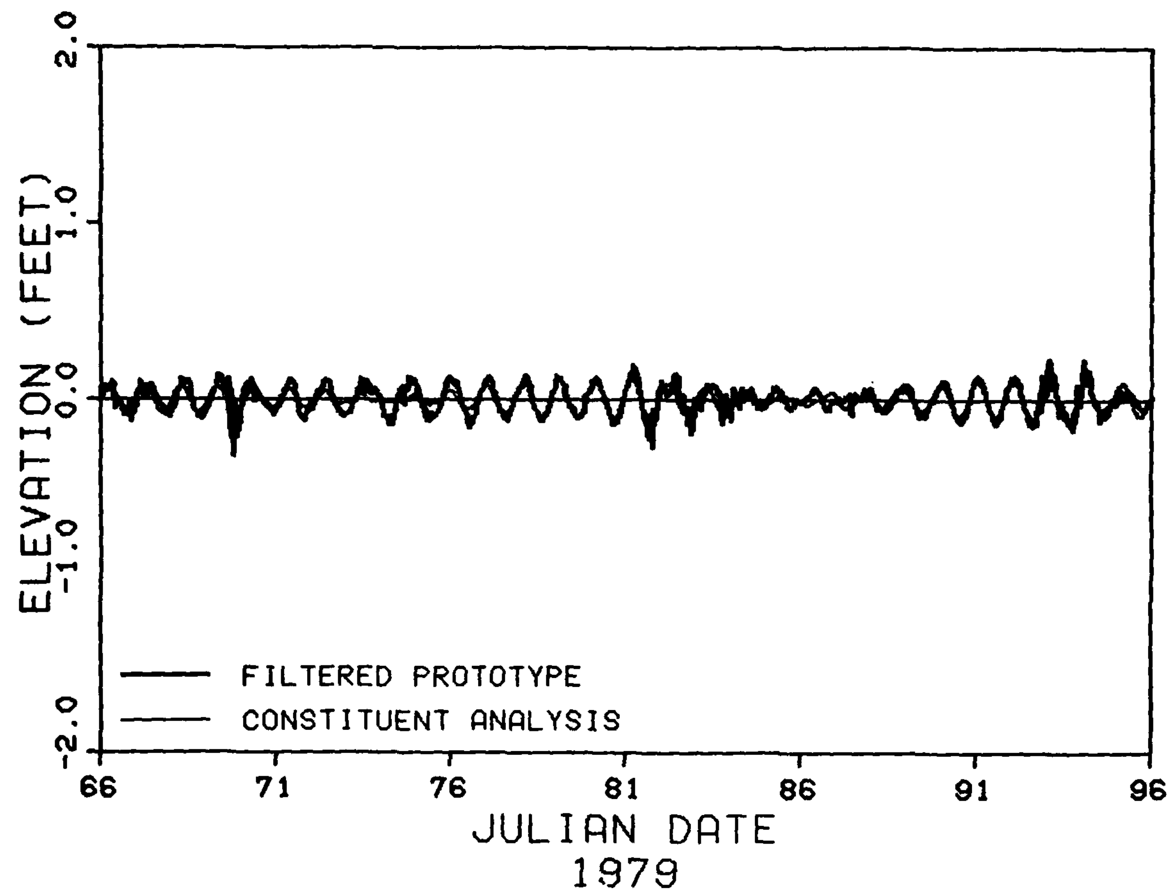
GAGE M-1

DAY 6 TO DAY 36 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE M-1
DAY 36 TO DAY 66 1979

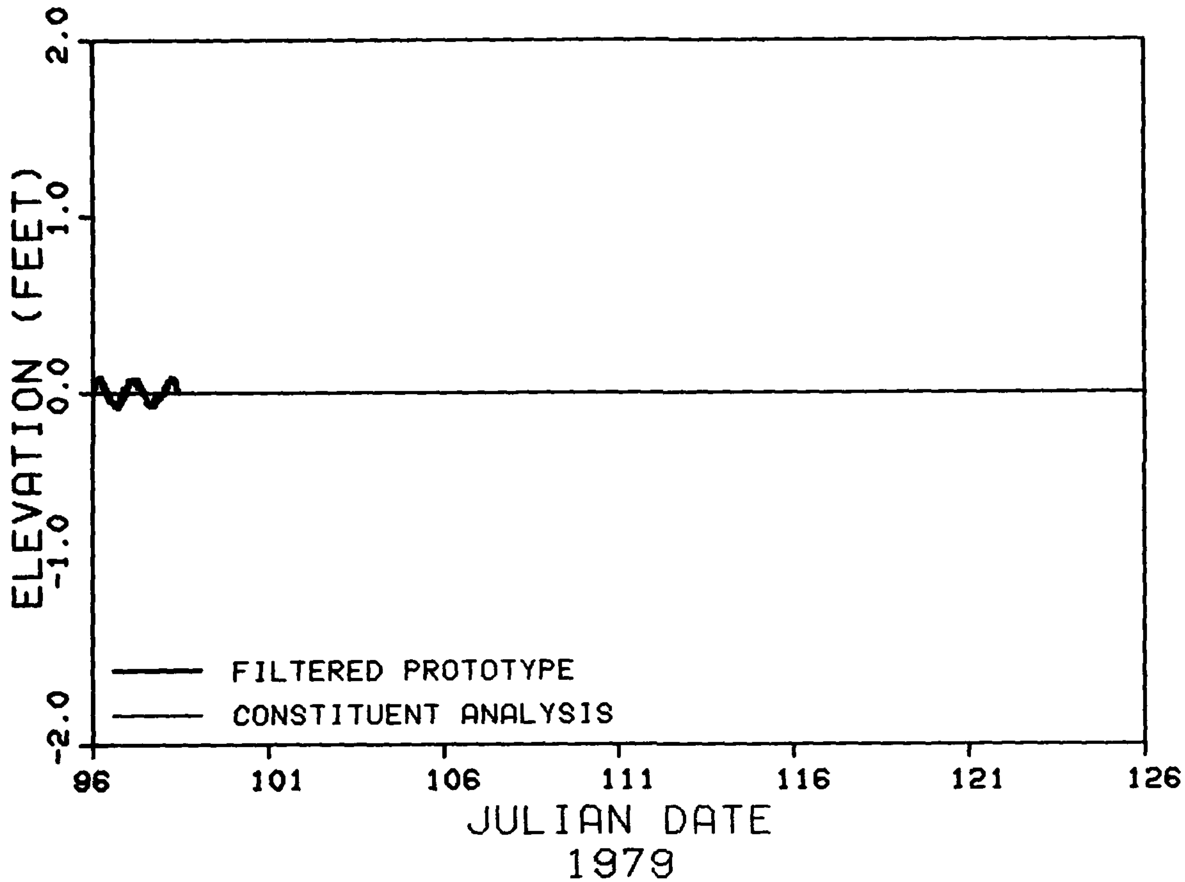


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

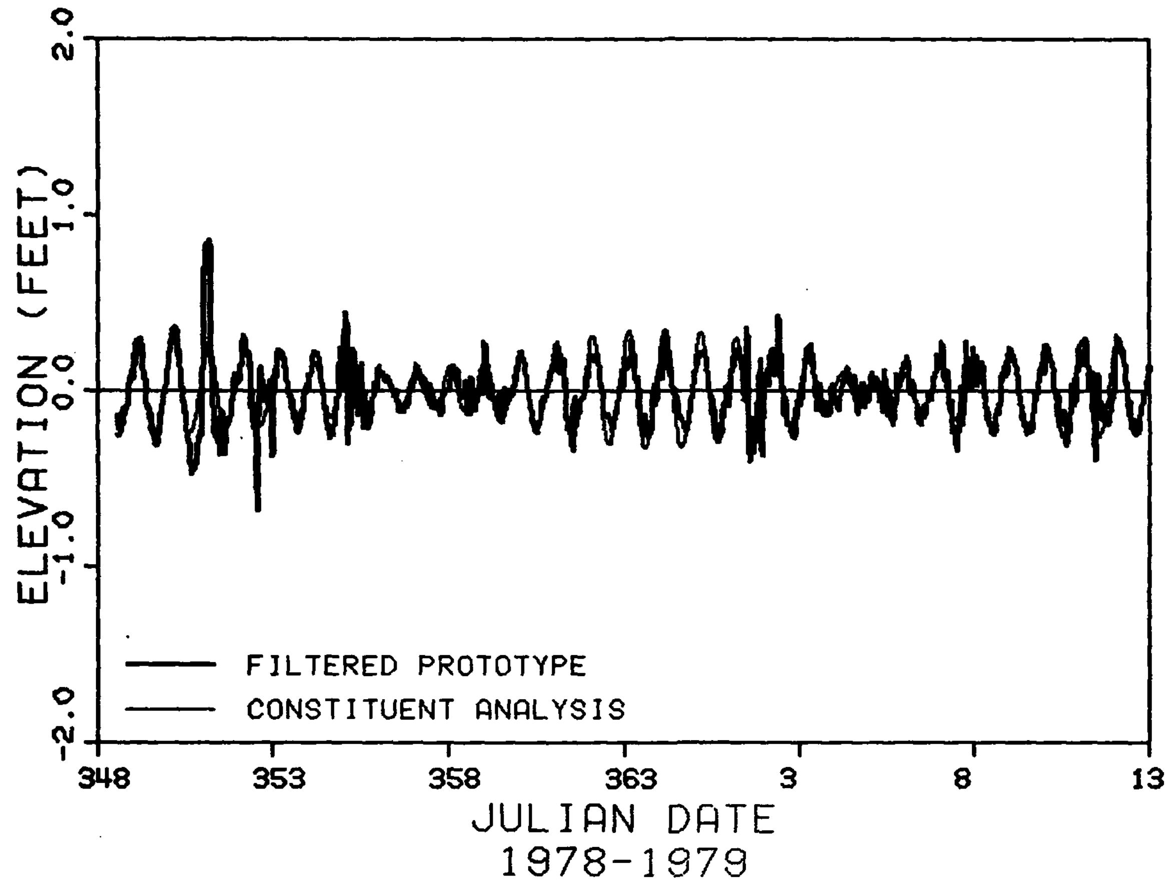
GAGE M-1

DAY 66 TO DAY 96 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE M-1
DAY 96 TO DAY 126 1979

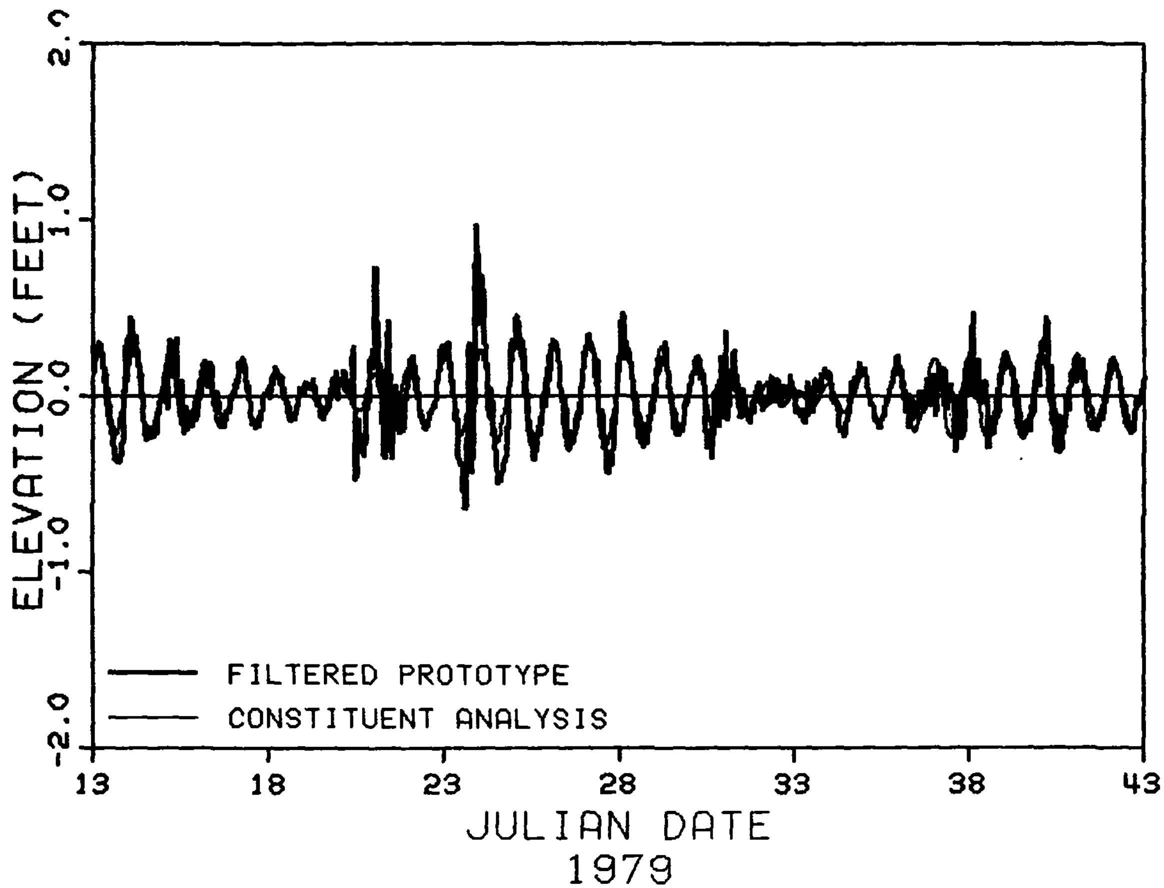


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE P-1

DAY 348 1978 TO DAY 13 1979

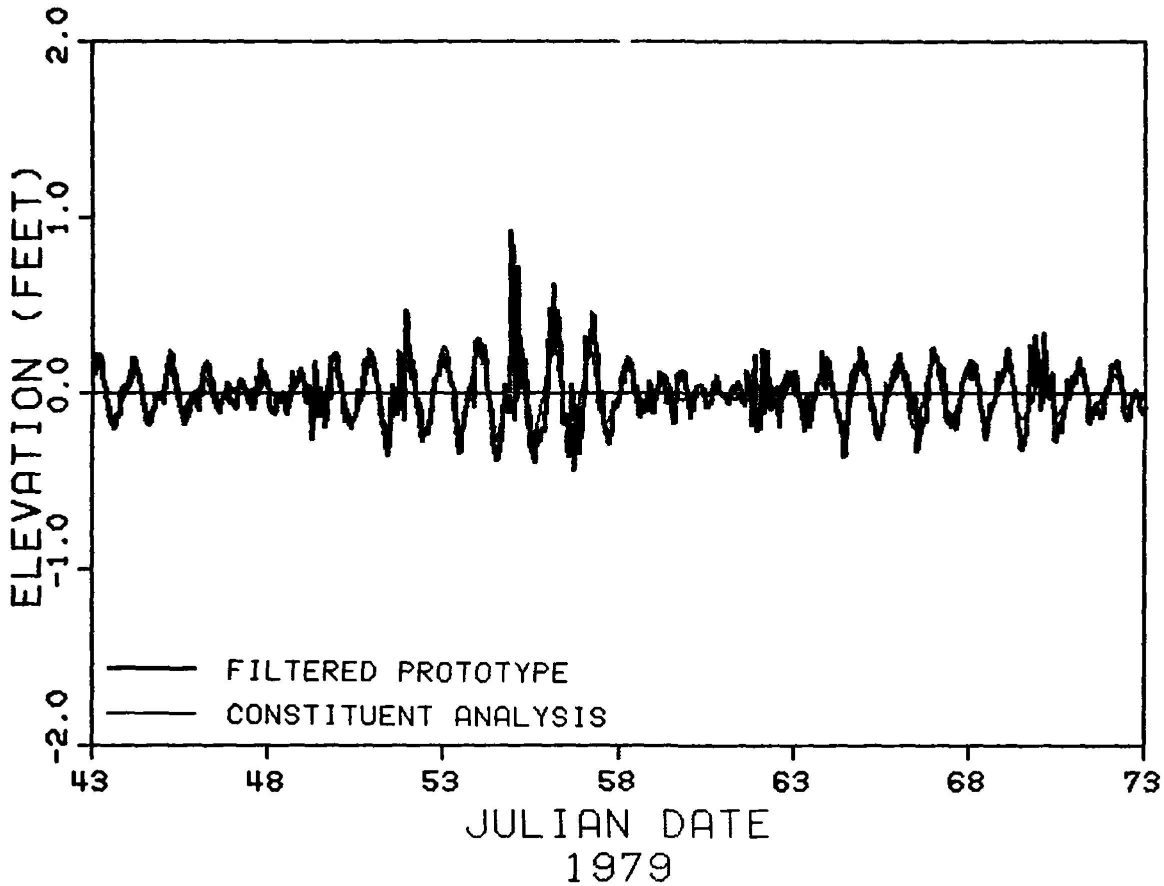


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

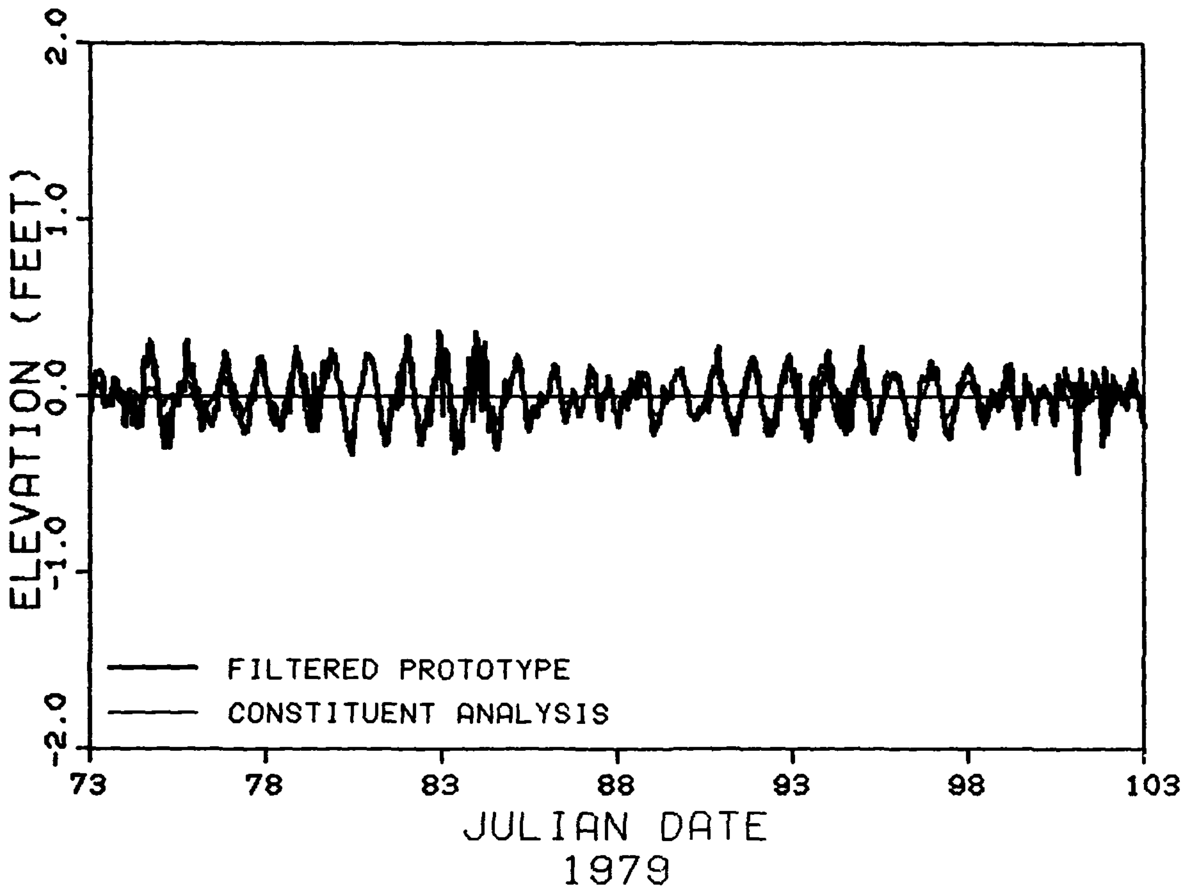
GAGE P-1

DAY 13 TO DAY 43 1979



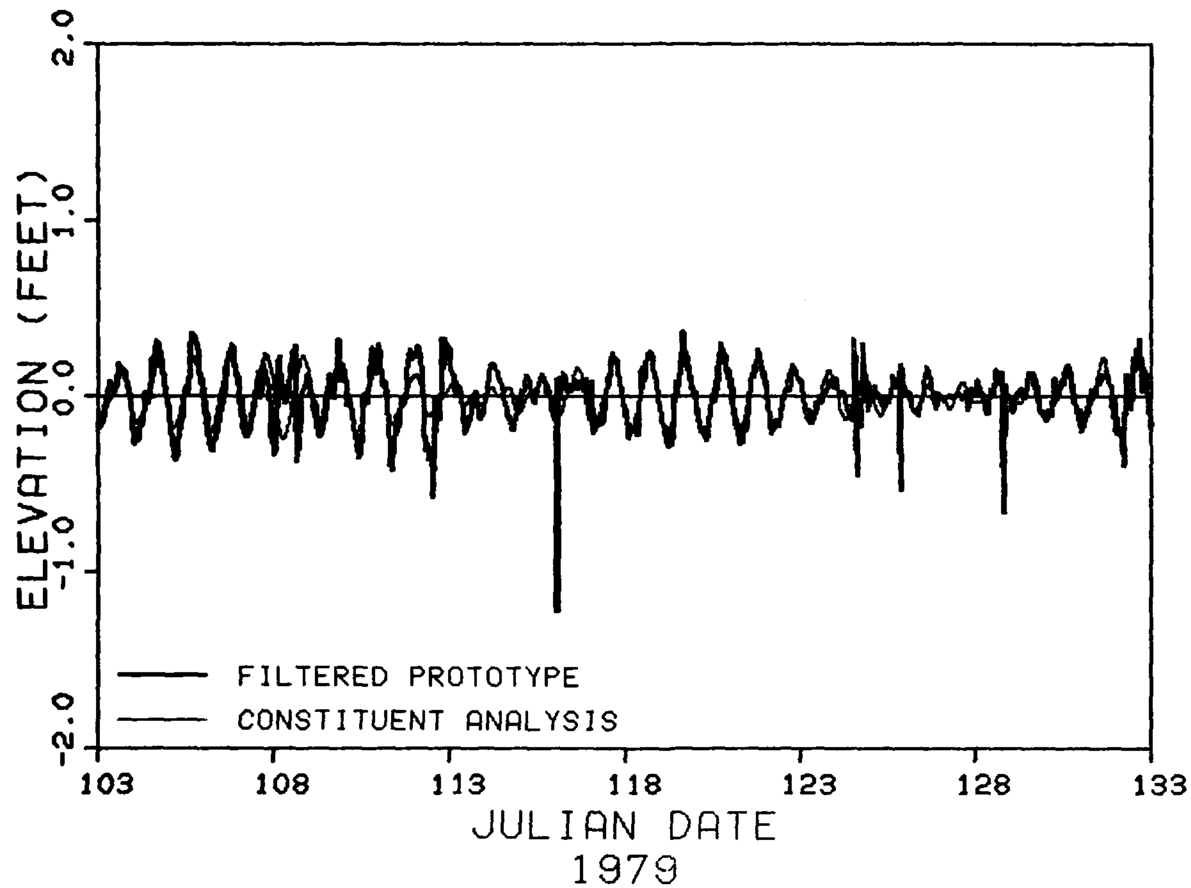
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THF RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-1
DAY 43 TO DAY 73 1979



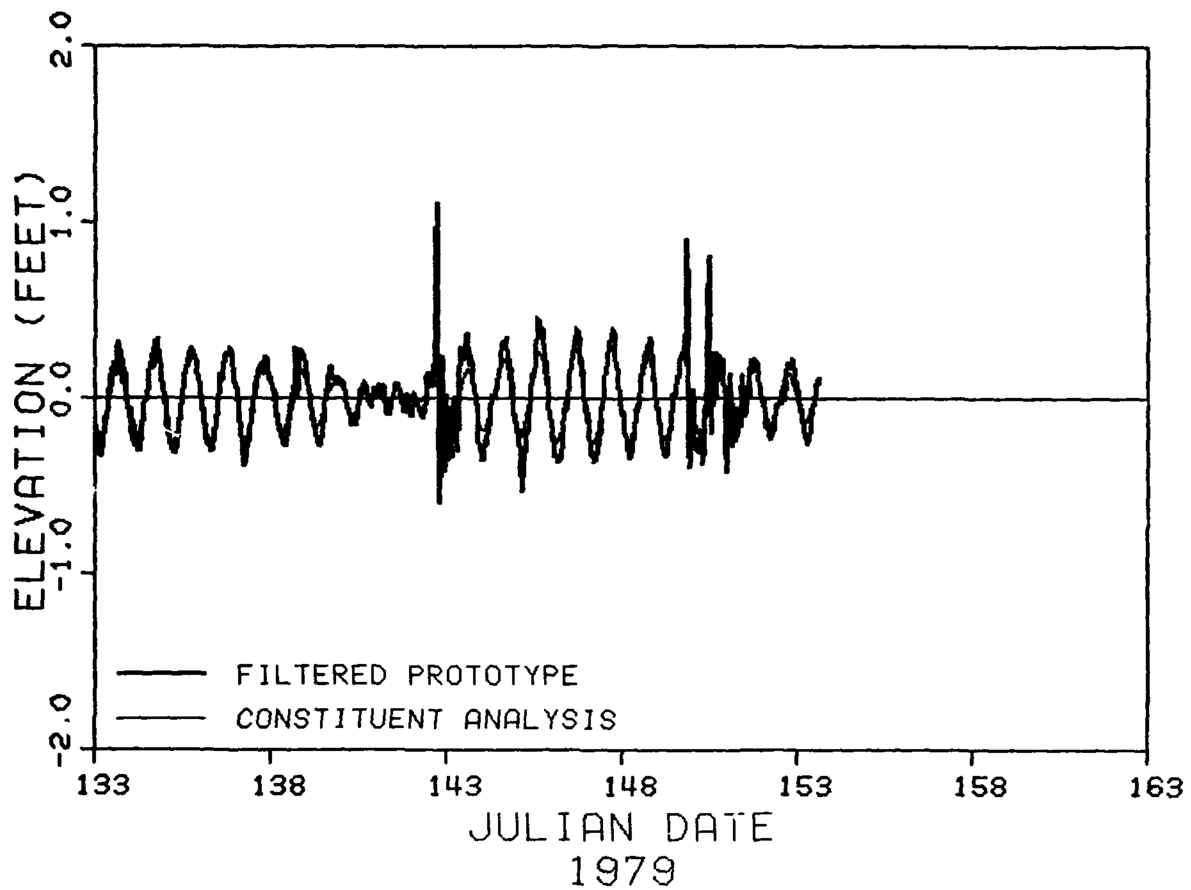
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-1
DAY 73 TO DAY 103 1979



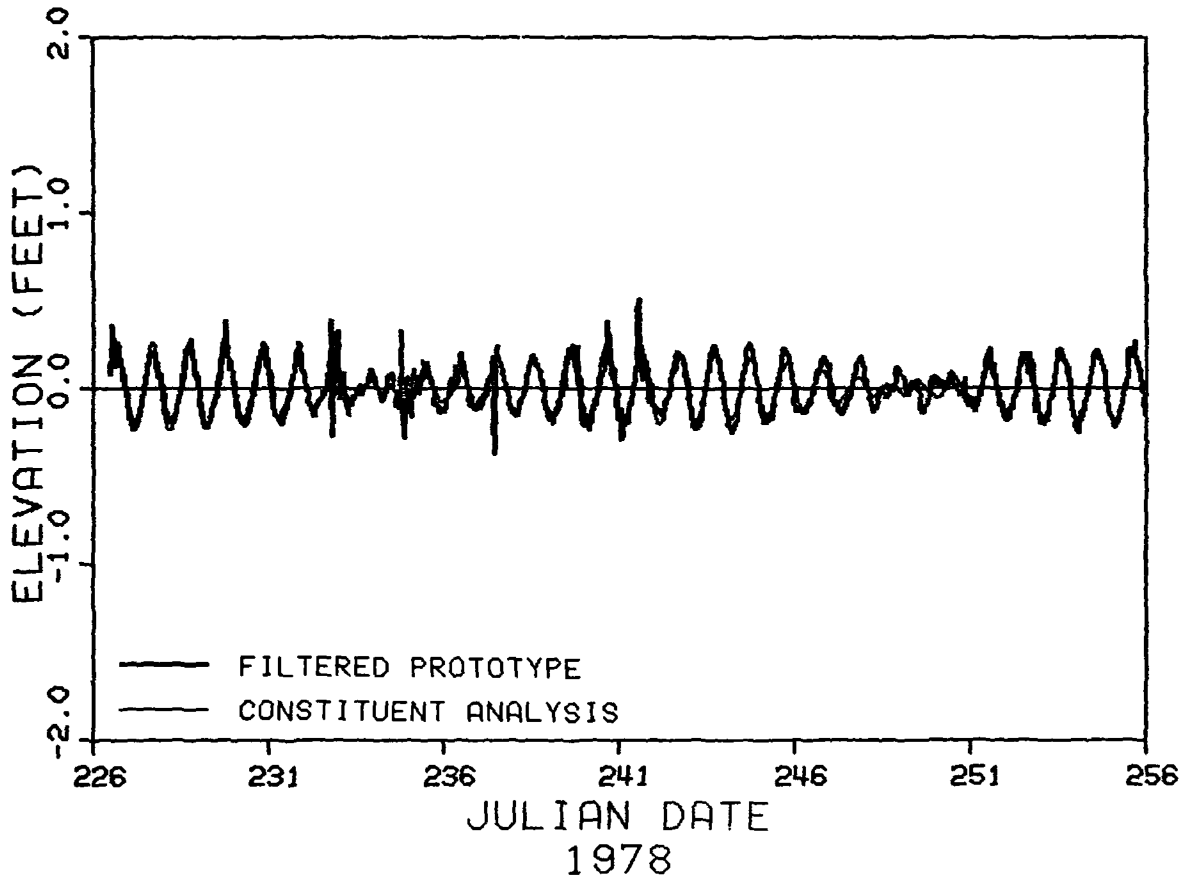
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-1
DAY 103 TO DAY 133 1979



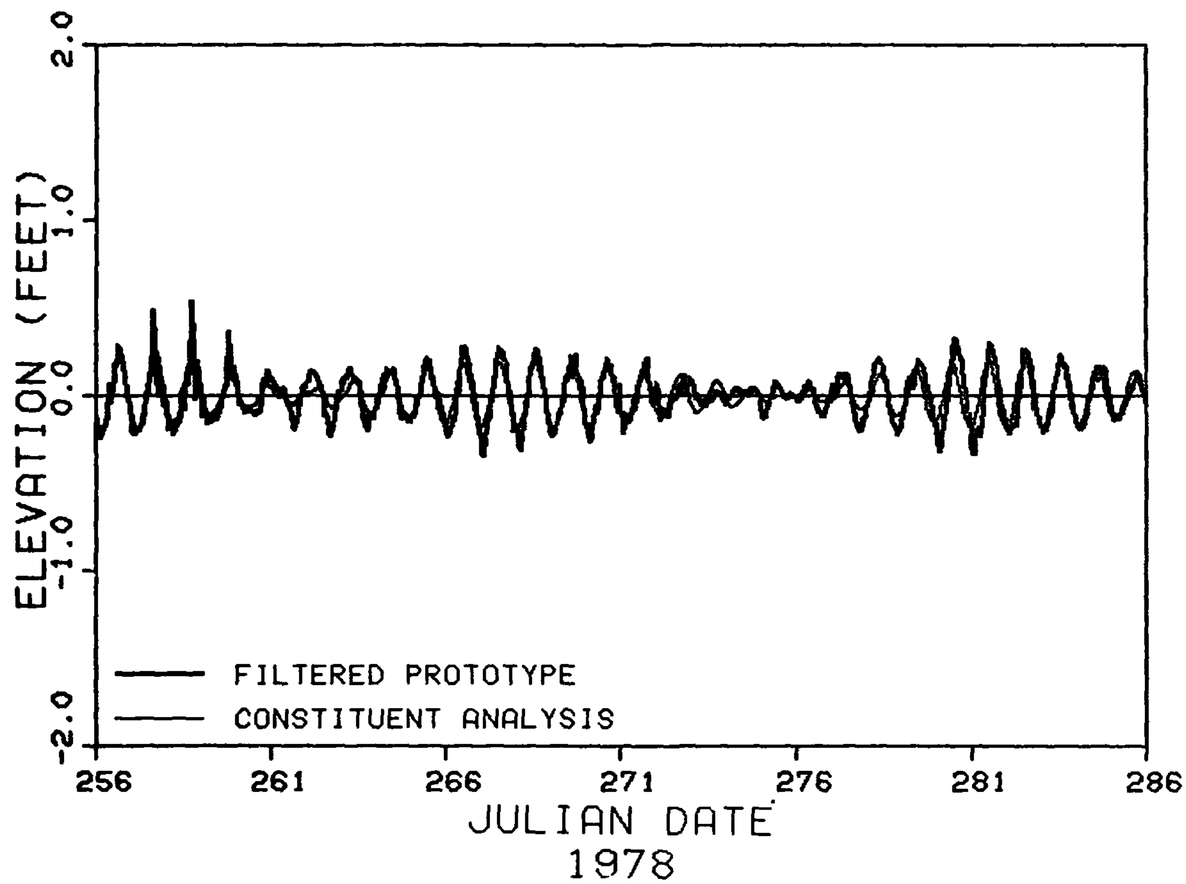
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-1
DAY 133 TO DAY 163 1979



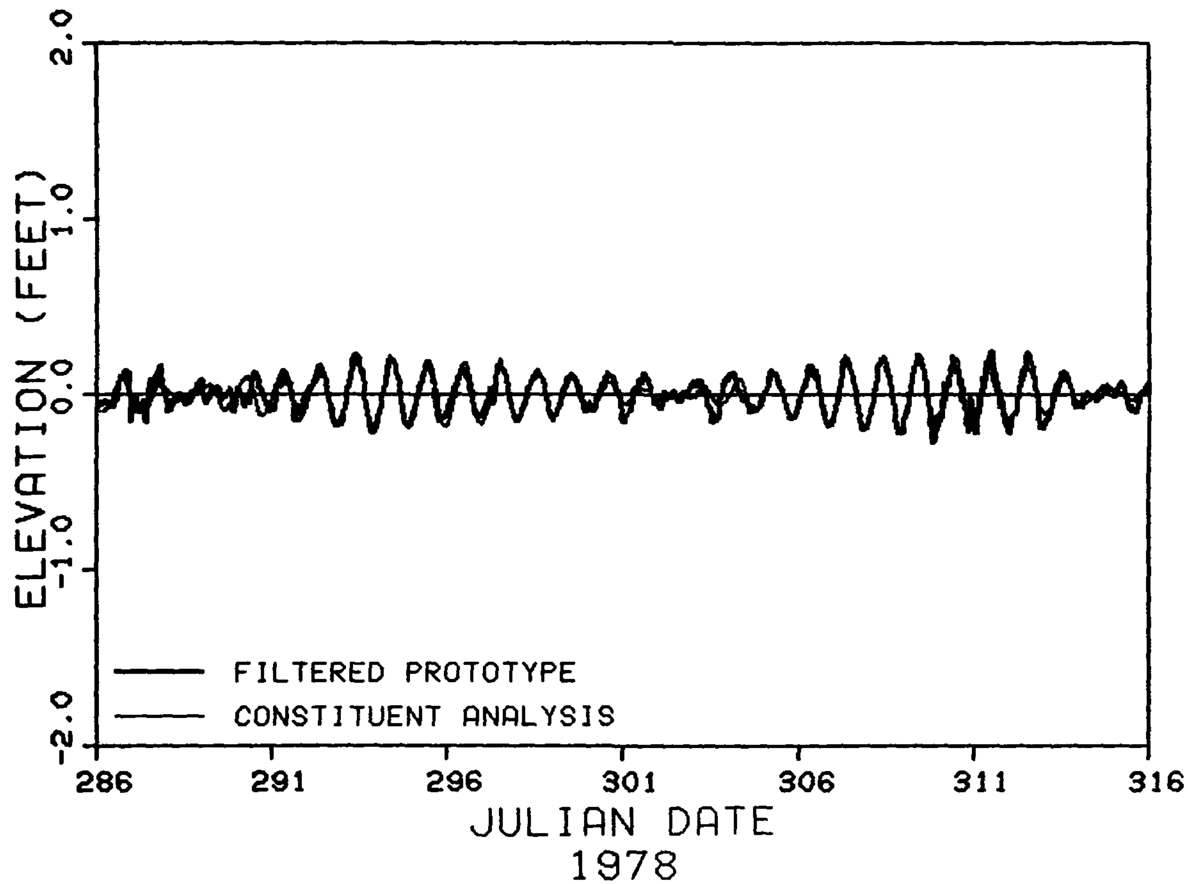
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-2
DAY 226 TO DAY 256 1978



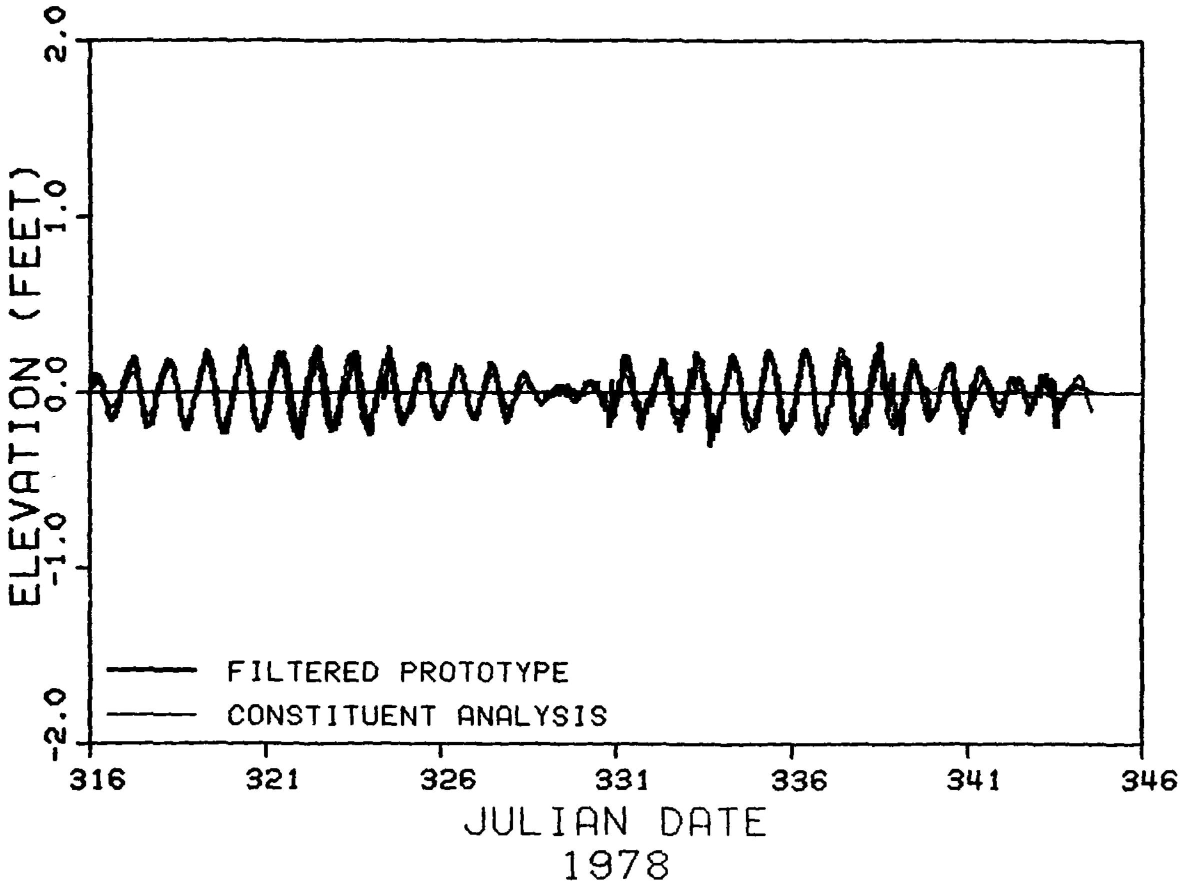
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-2
DAY 256 TO DAY 286 1978



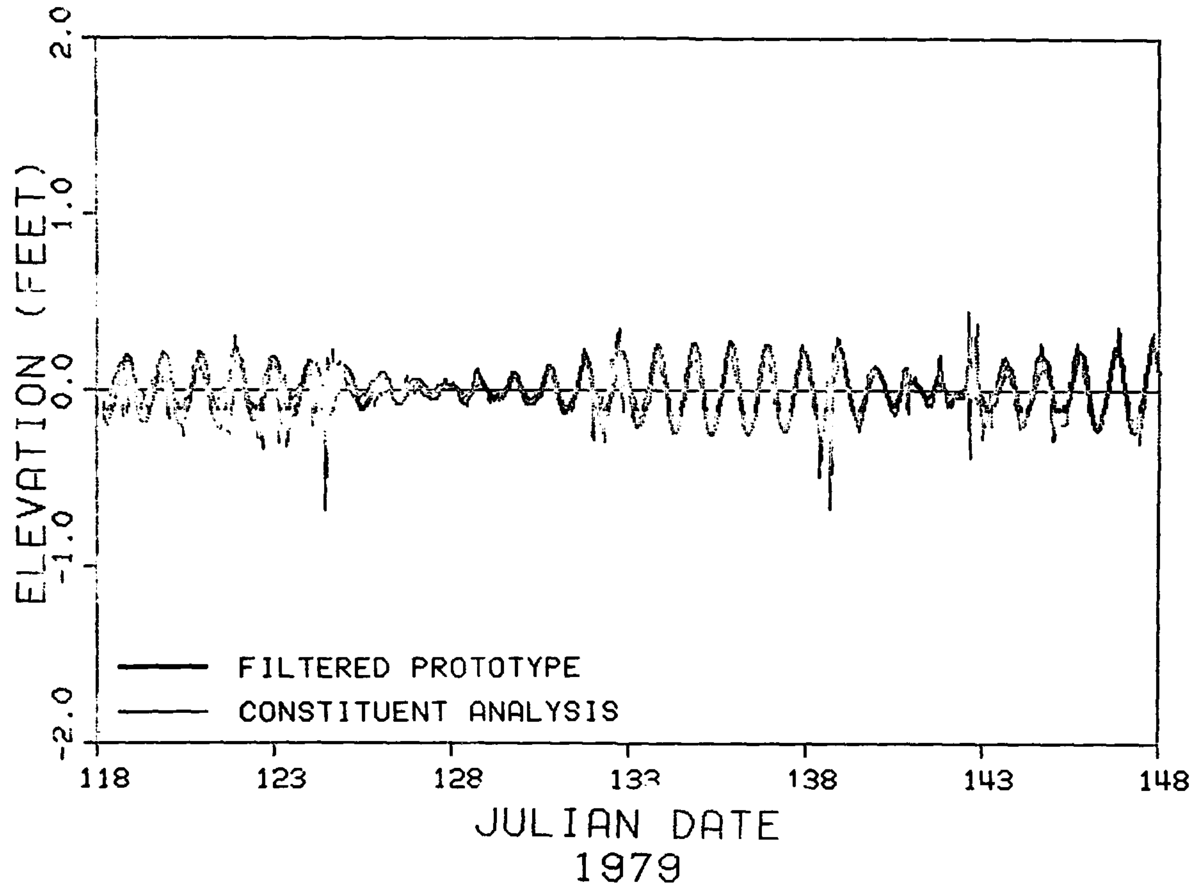
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-2
DAY 286 TO DAY 316 1978



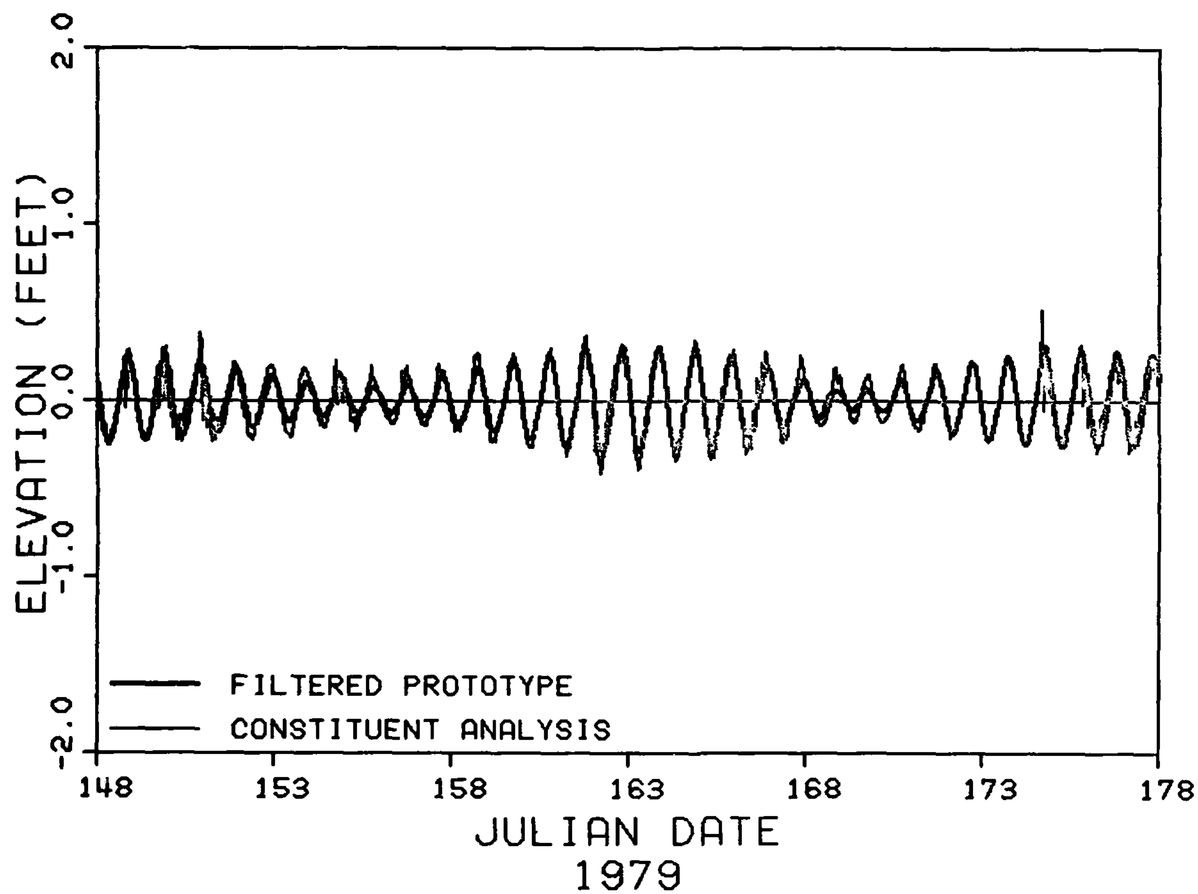
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-2
DAY 316 TO DAY 346 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-3
DAY 118 TO DAY 148 1979

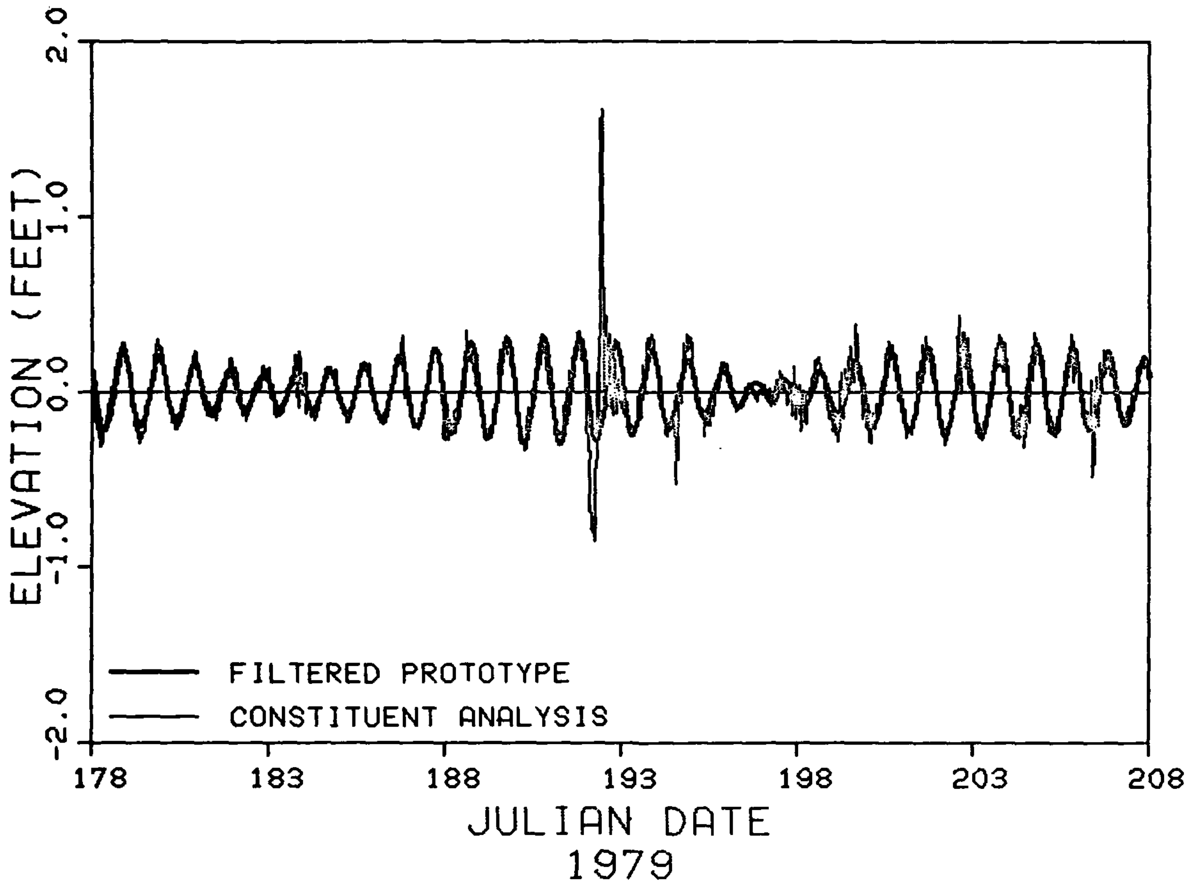


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

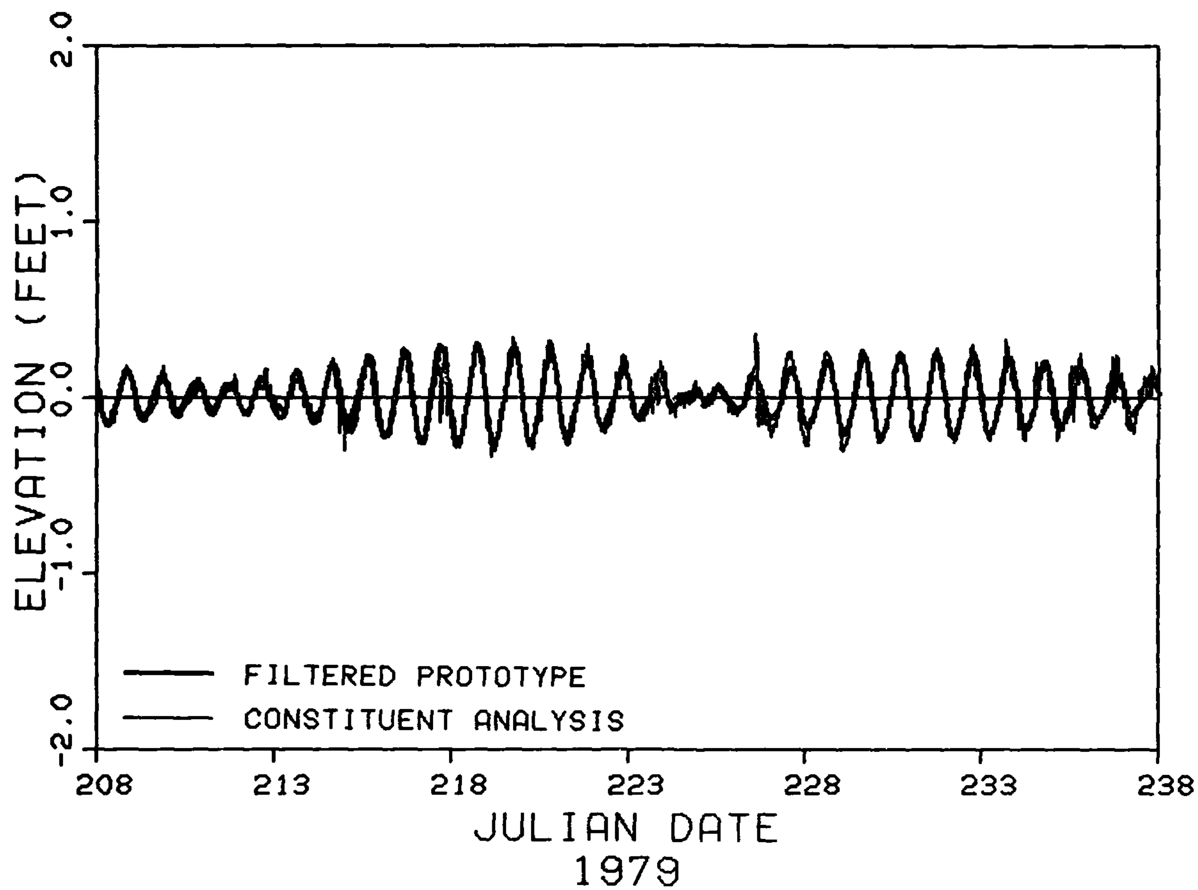
GAGE P-3

DAY 148 TO DAY 178 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-3
DAY 178 TO DAY 208 1979



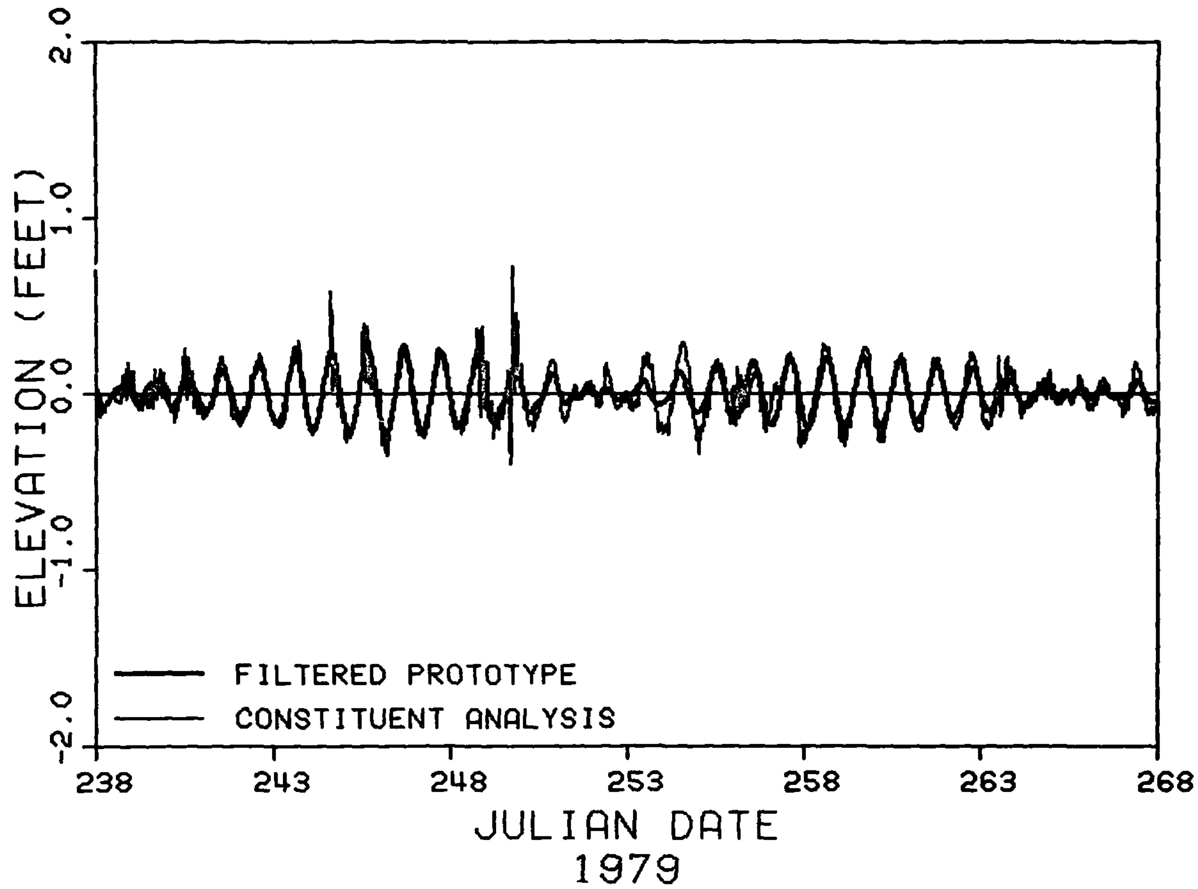
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE P-3

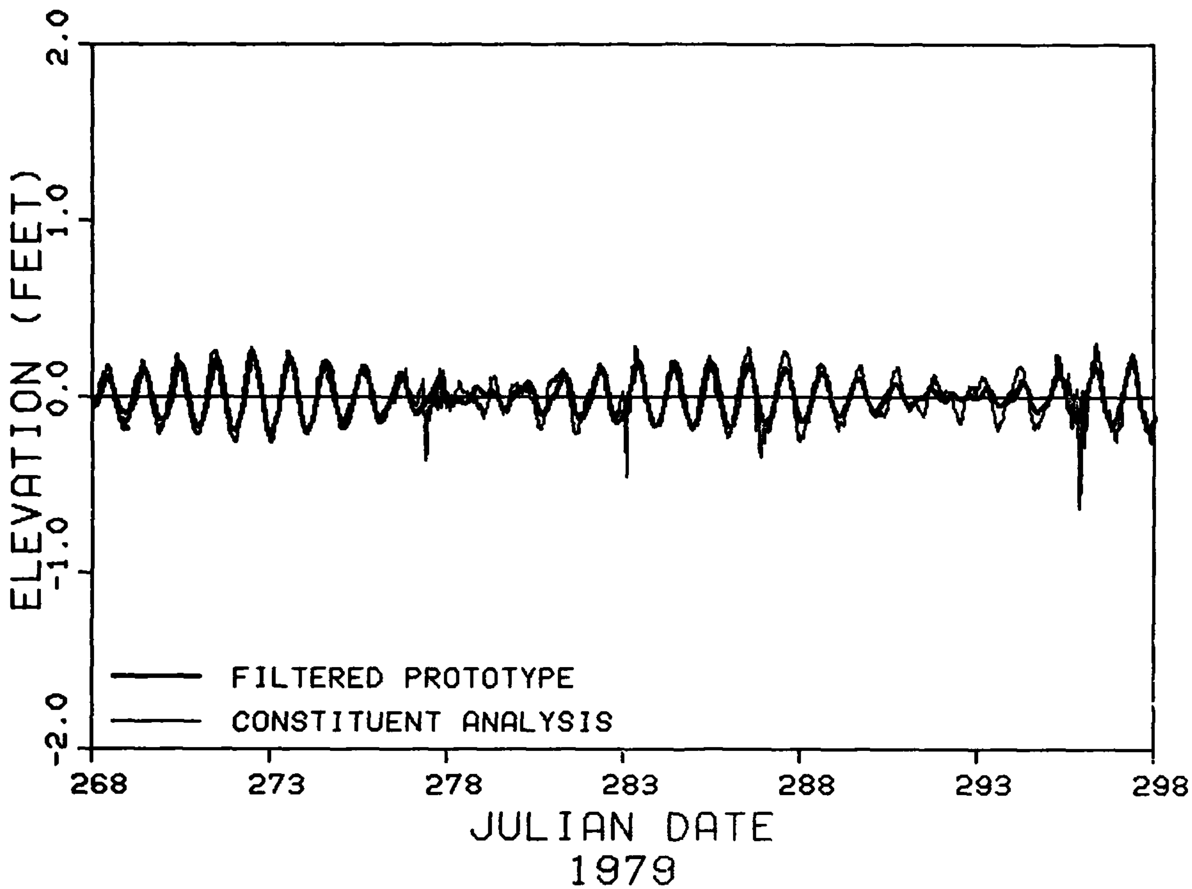
DAY 208 TO DAY 238 1979

PLATE 84



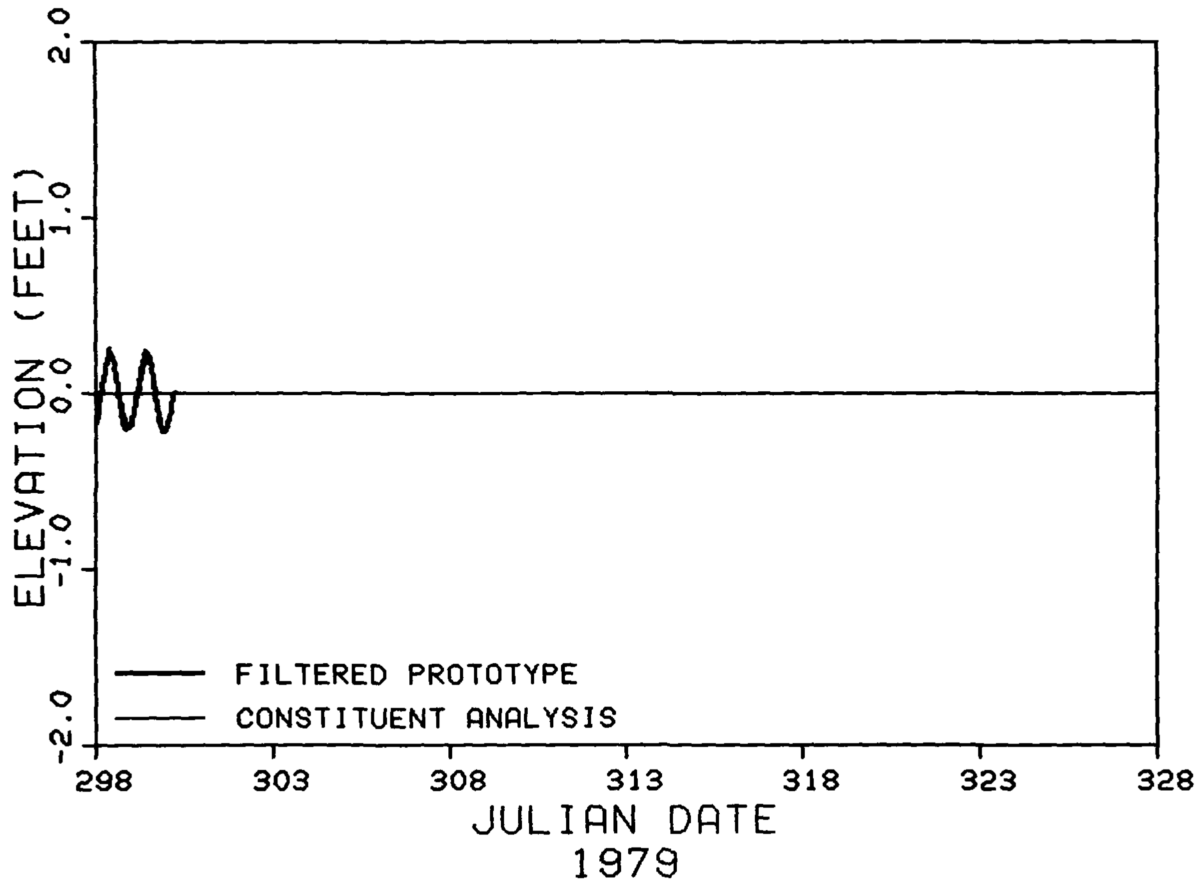
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPF DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-3
DAY 238 TO DAY 268 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-3
DAY 268 TO DAY 298 1979

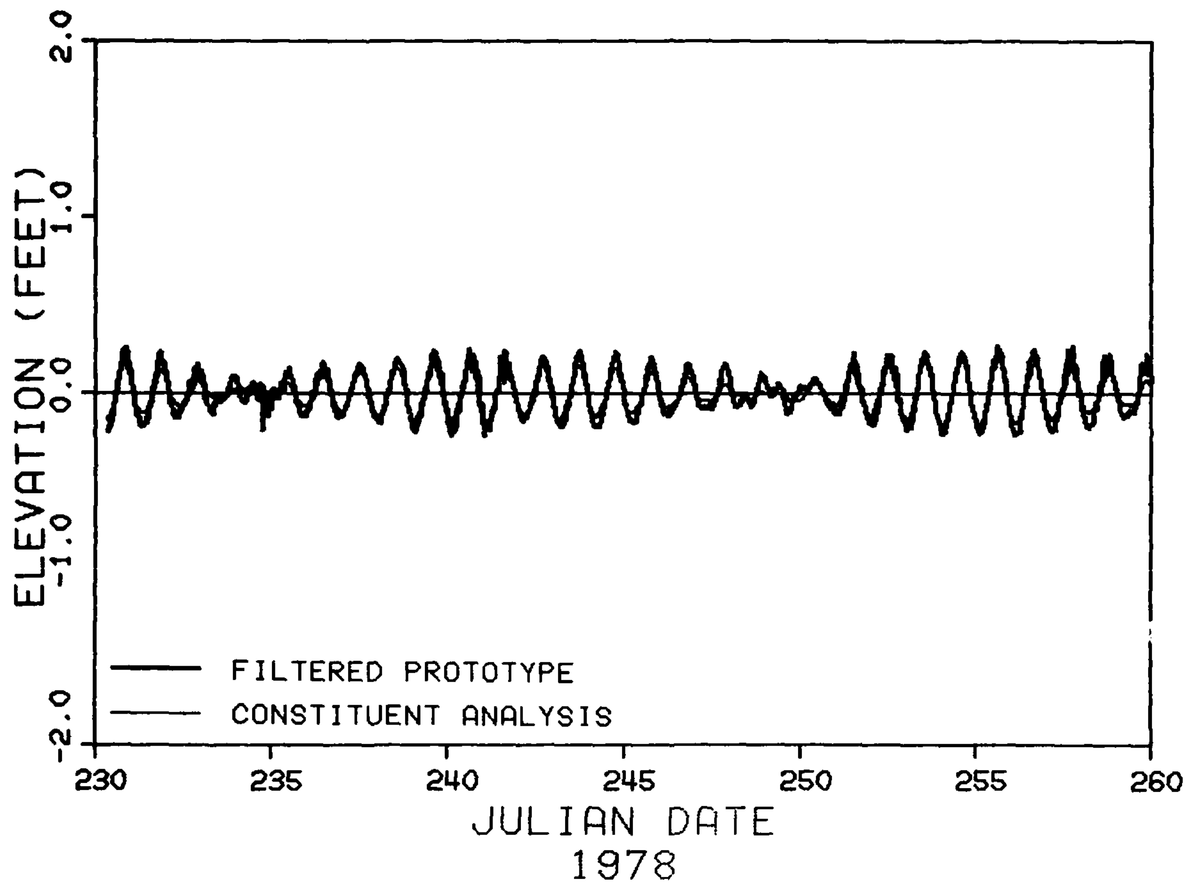


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE P-3

DAY 298 TO DAY 328 1979

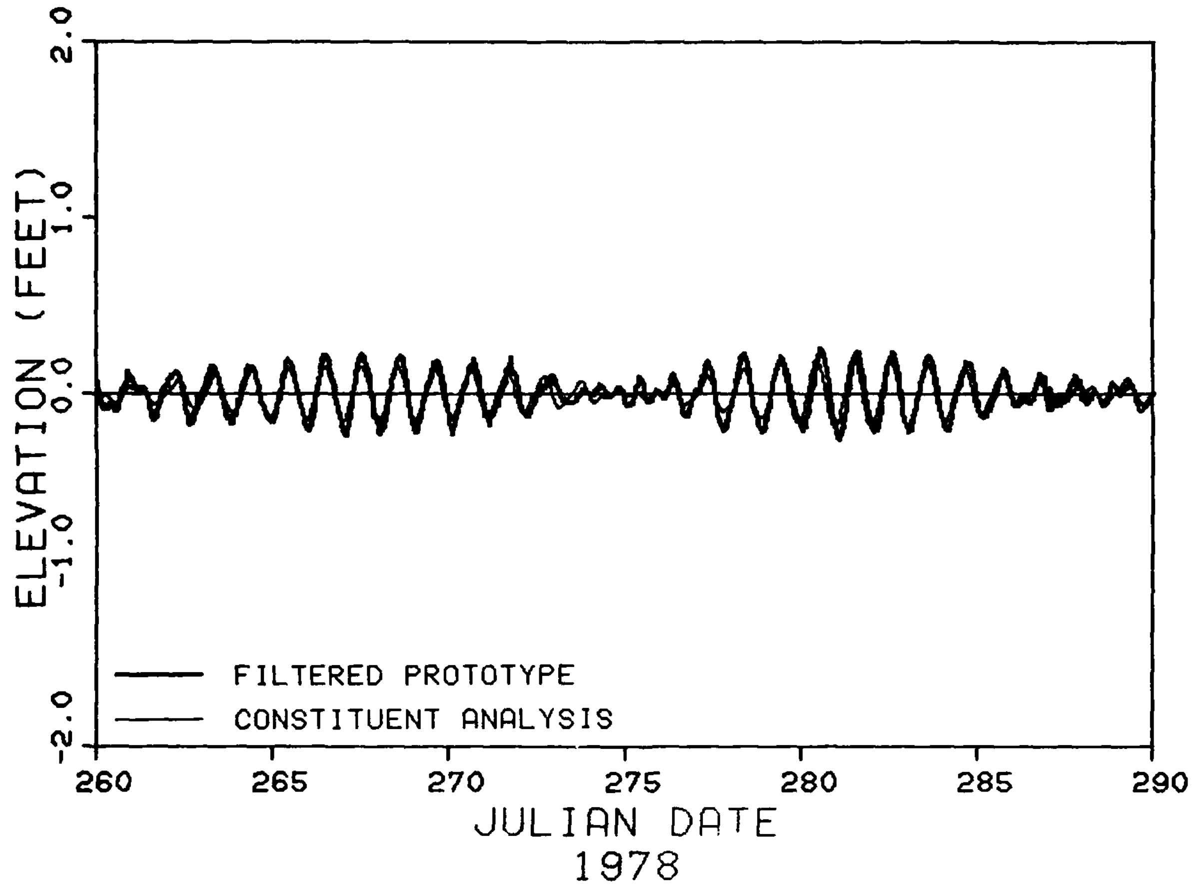


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE P-4

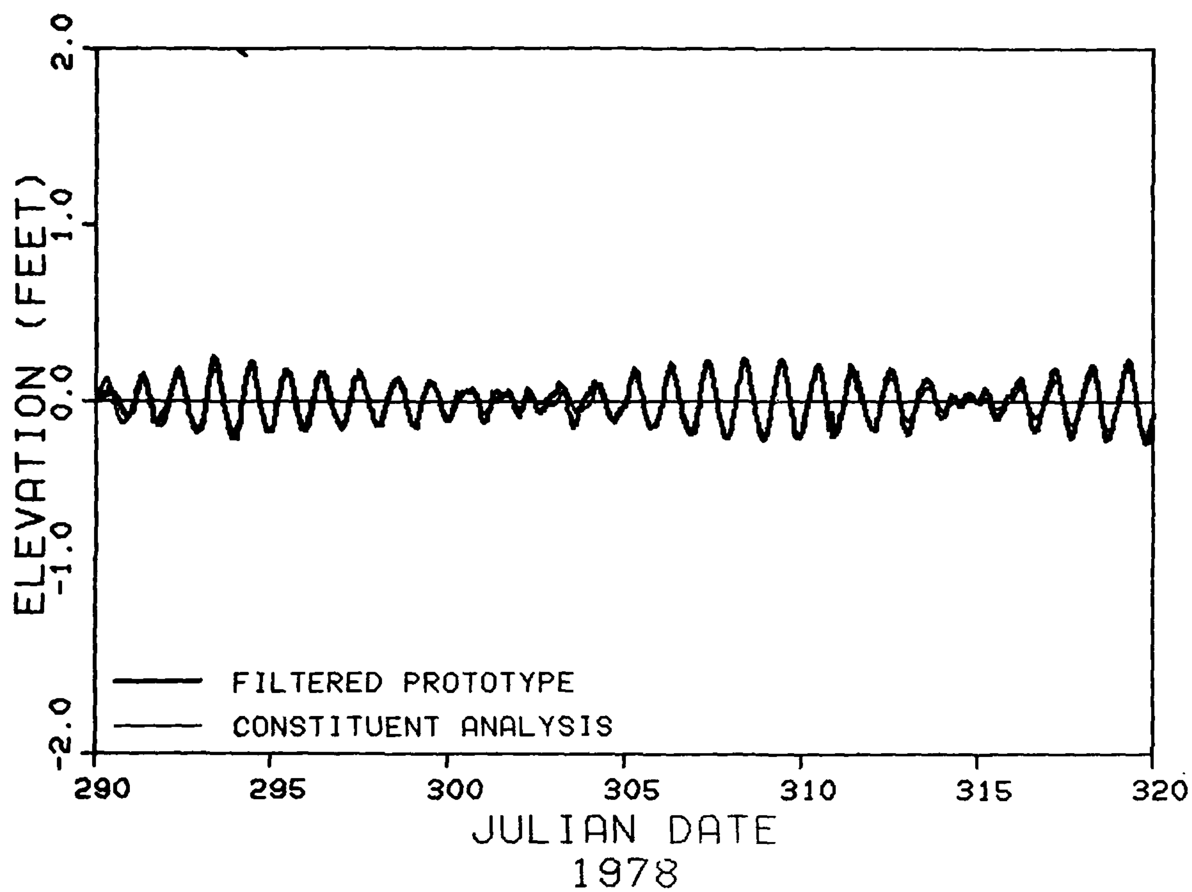
DAY 230 TO DAY 260 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

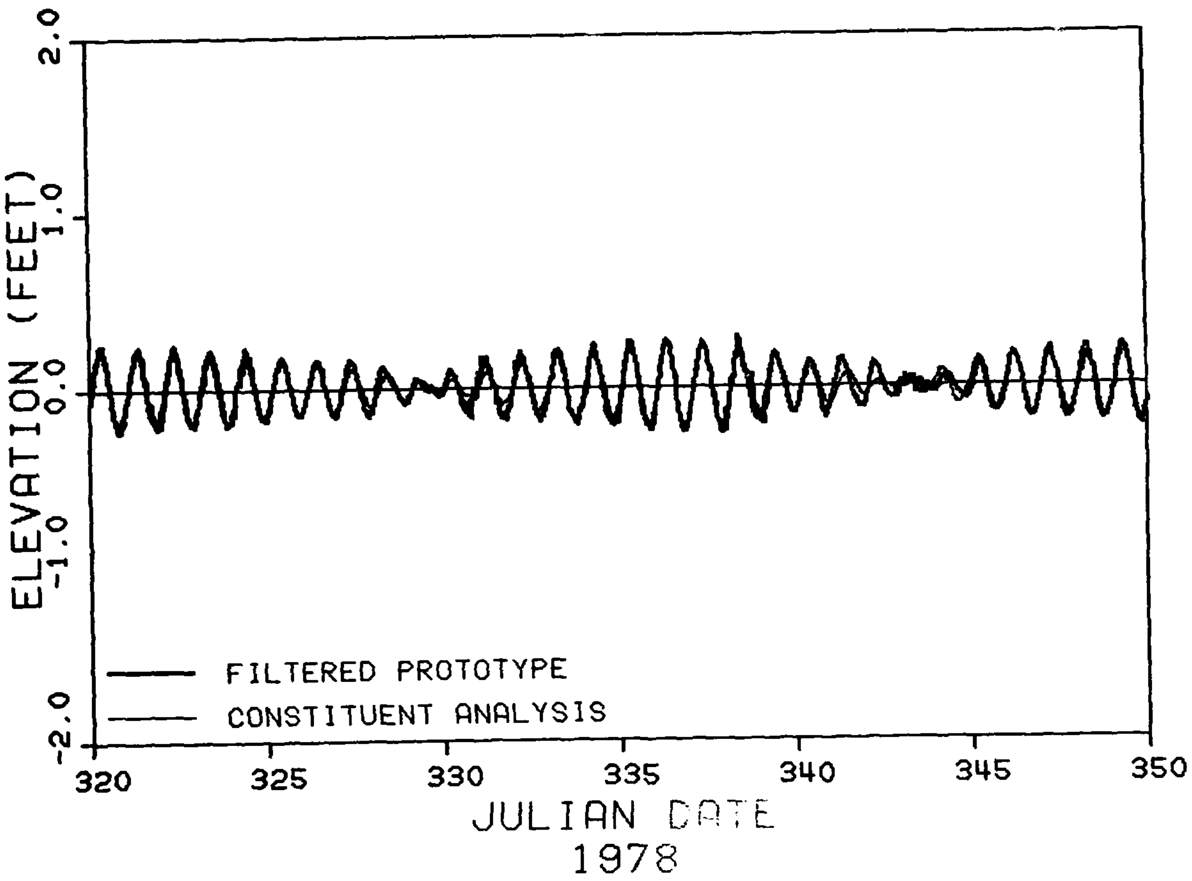
TIDAL ELEVATION ANALYSIS
GAGE P-4
DAY 260 TO DAY 290 1978

PLATE 89



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-4
DAY 290 TO DAY 320 1978

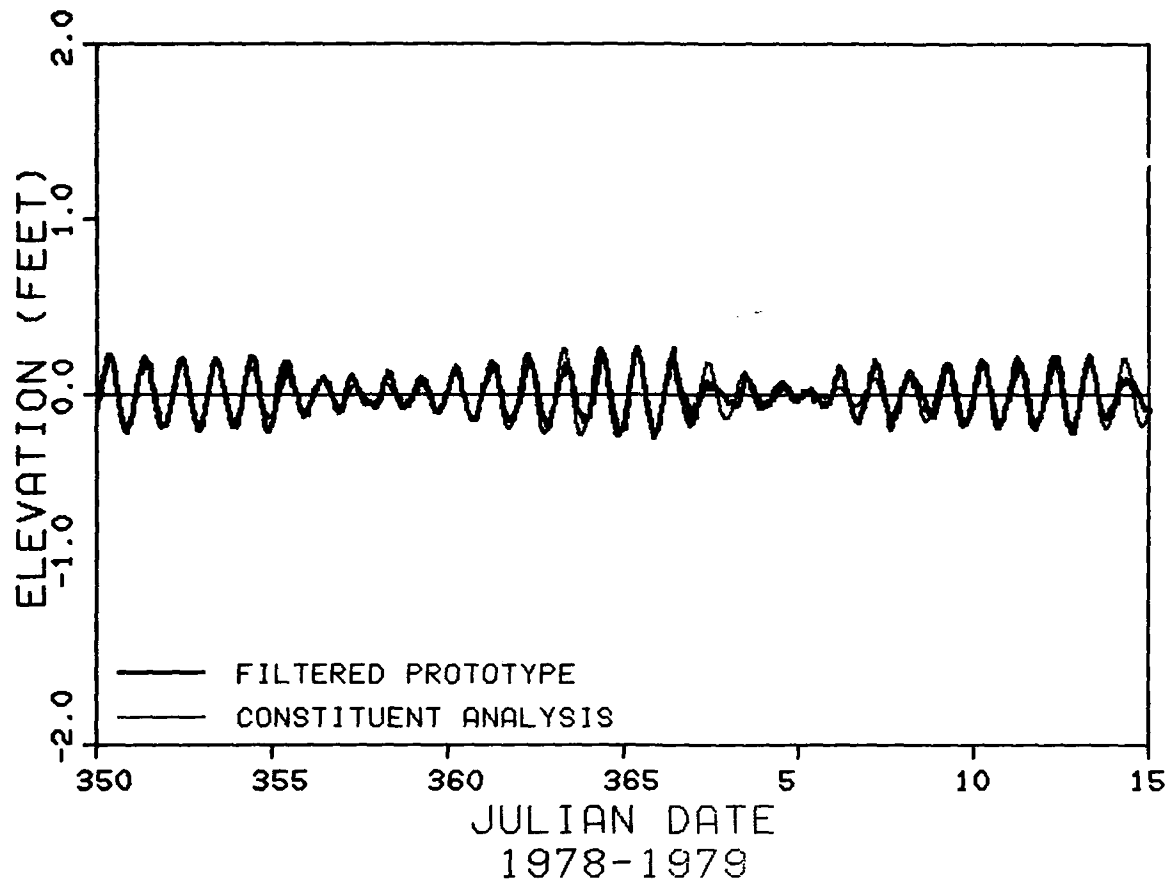


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

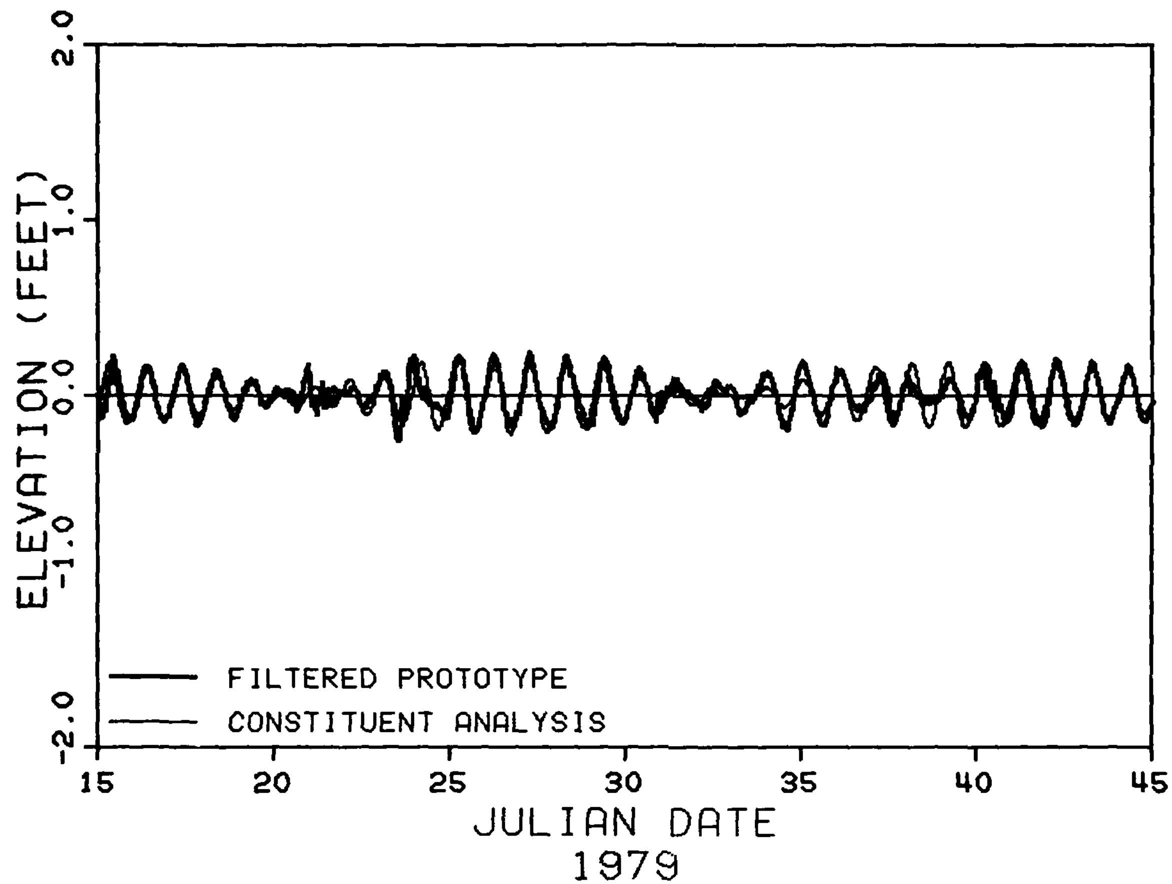
GAGE P-4

DAY 320 TO DAY 350 1978



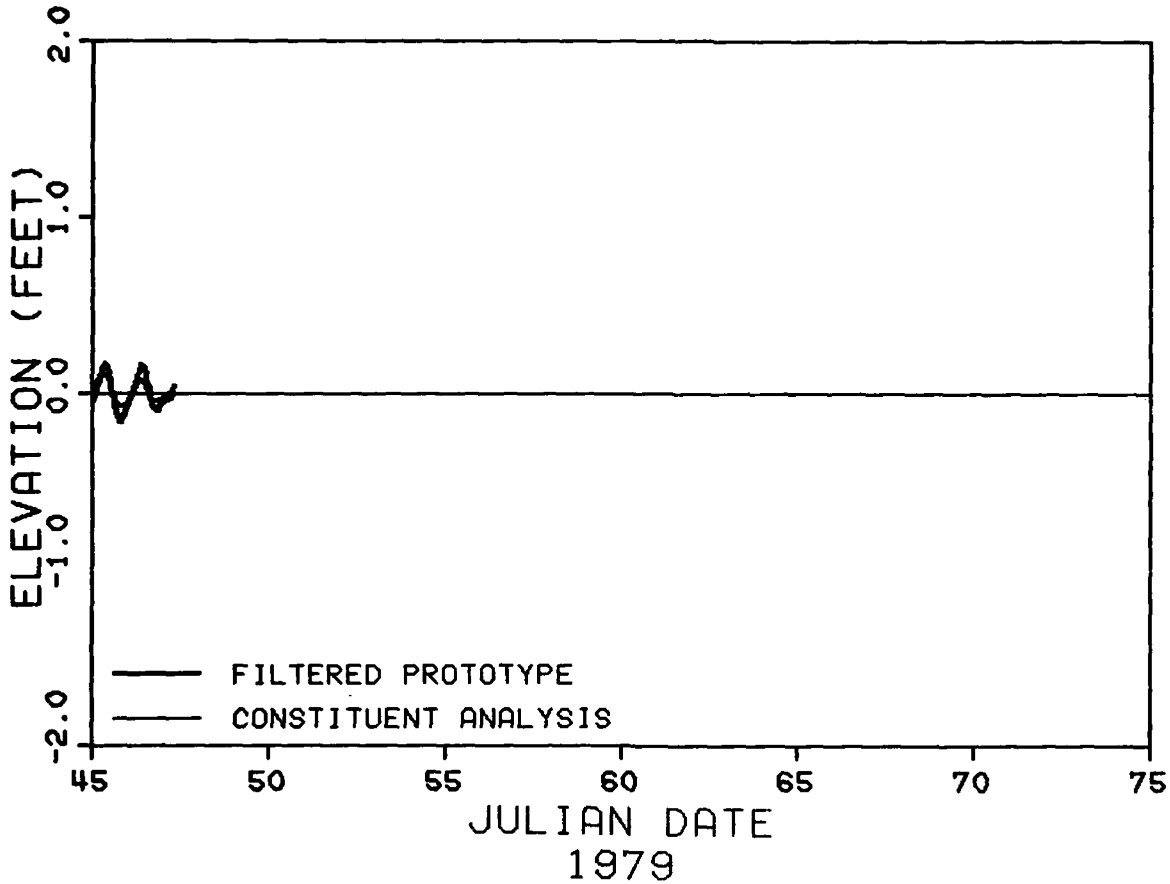
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-4
DAY 350 1978 TO DAY 15 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-4
DAY 15 TO DAY 45 1979

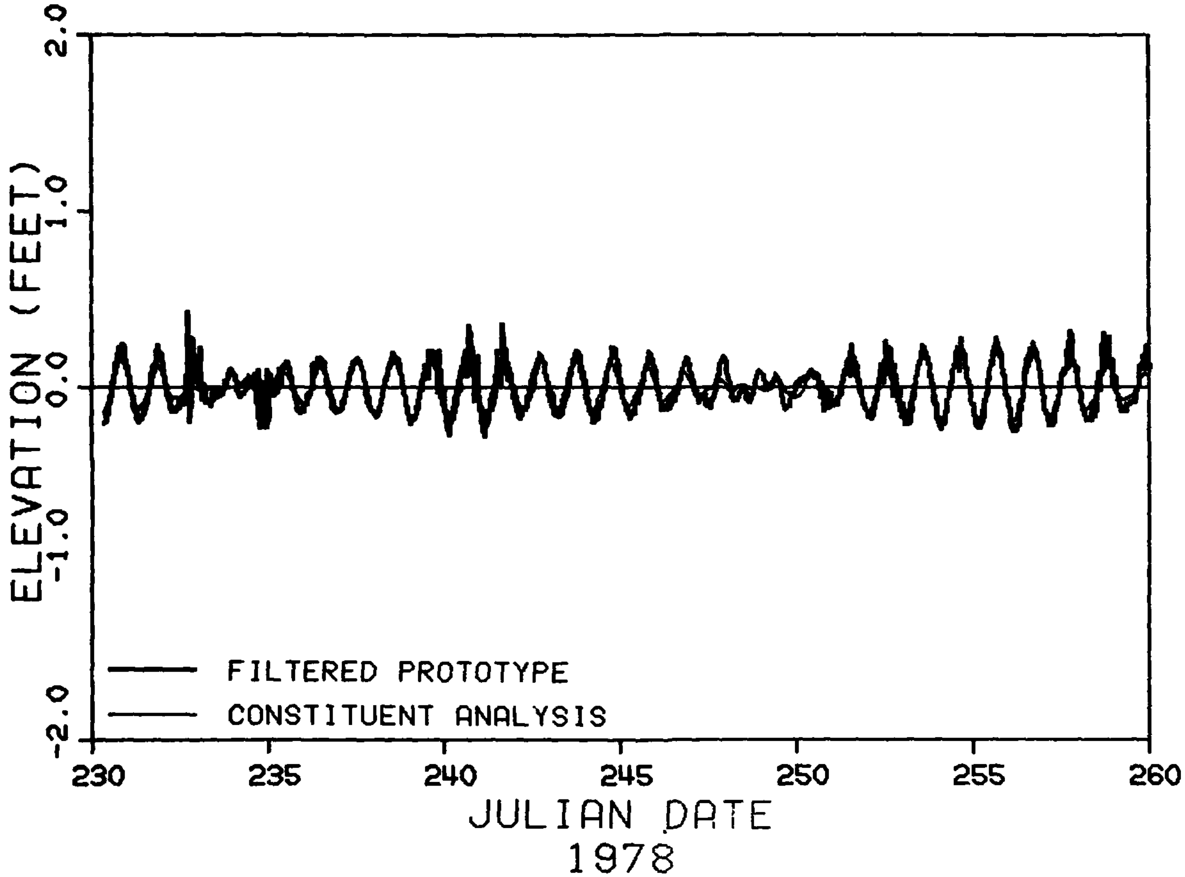


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

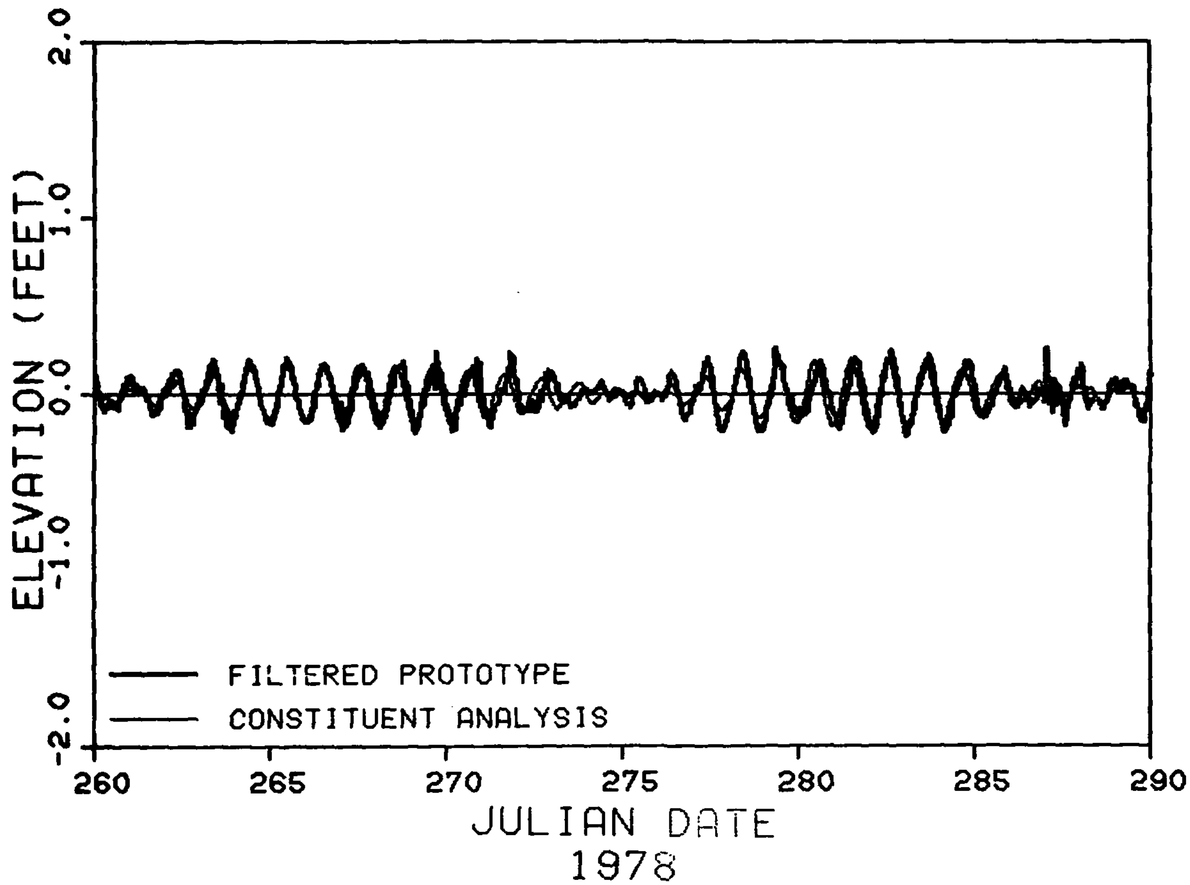
GAGE P-4

DAY 45 TO DAY 75 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-5
DAY 230 TO DAY 260 1978

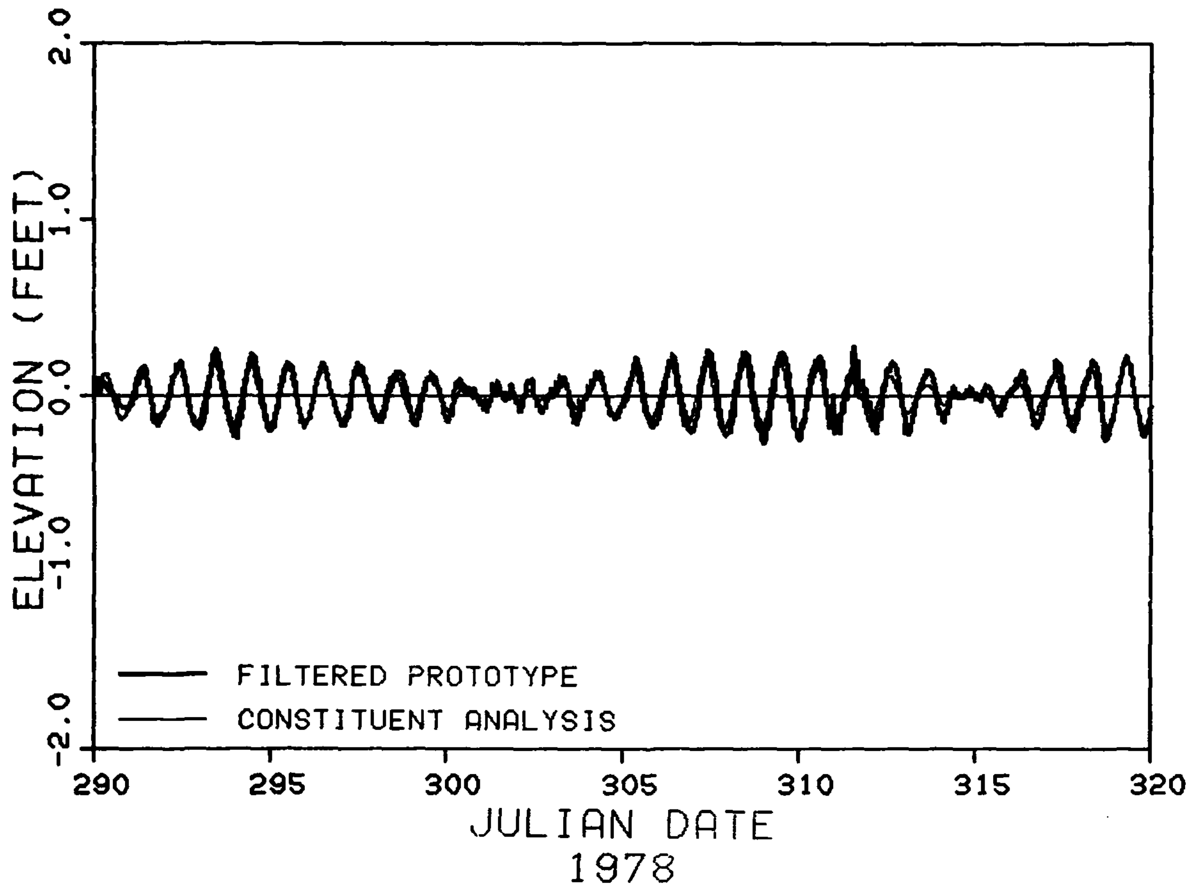


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

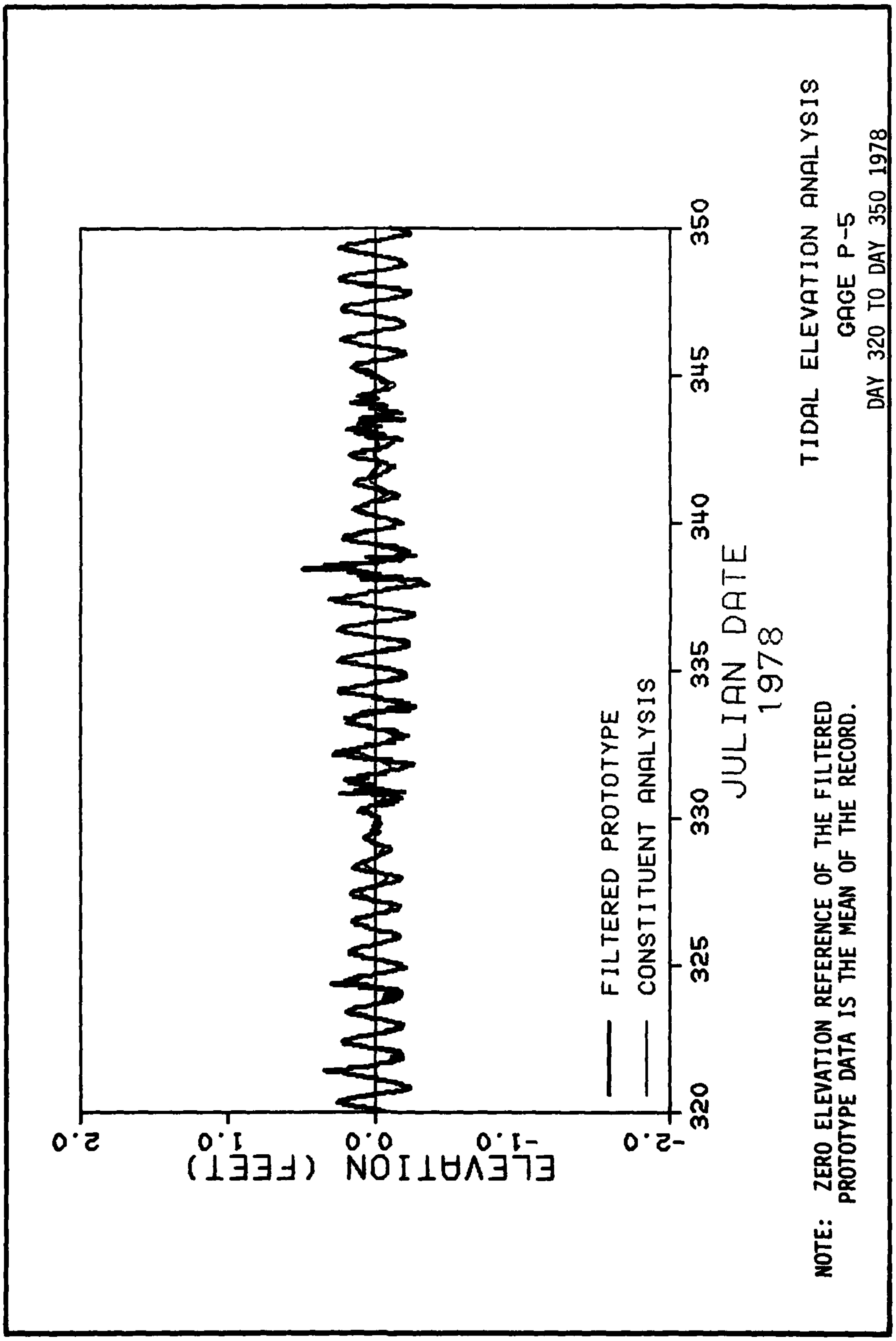
GAGE P-5

DAY 260 TO DAY 290 1978



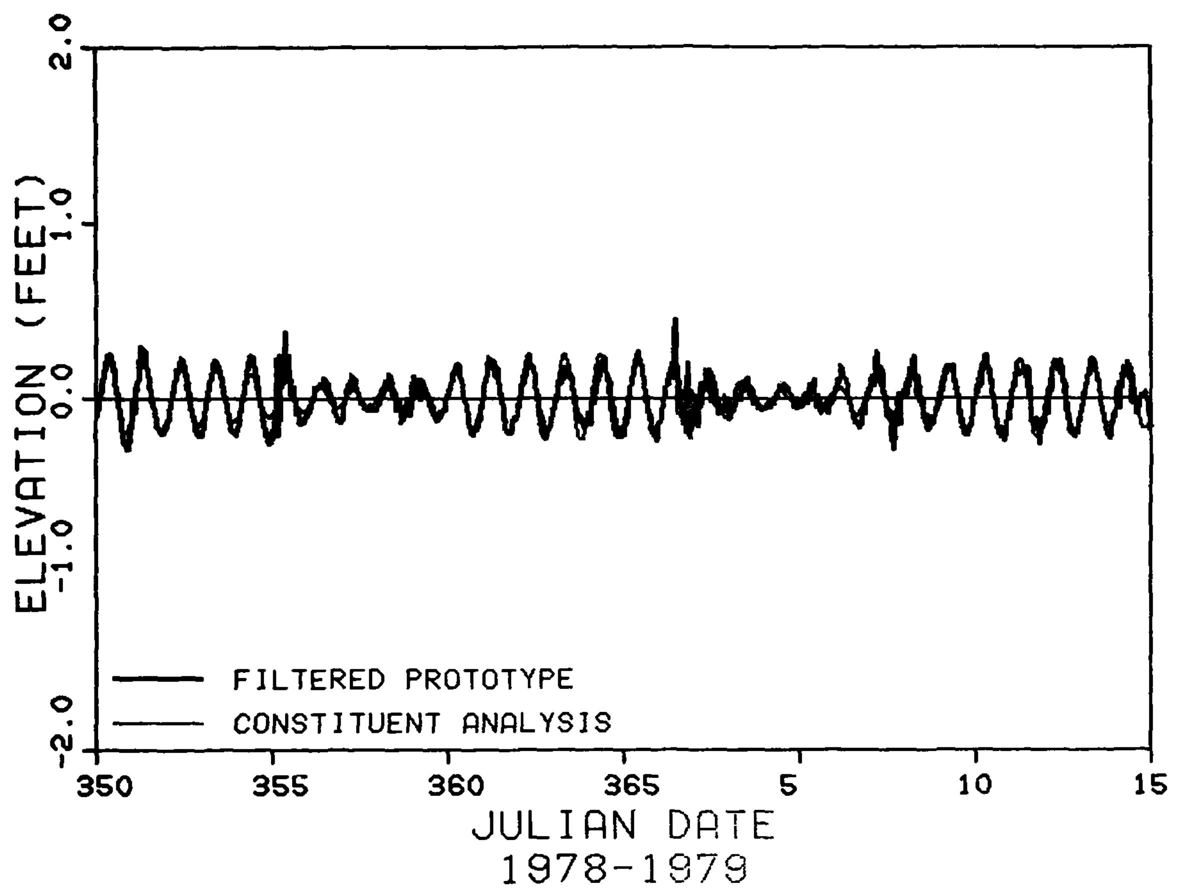
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-5
DAY 290 TO DAY 320 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

PLATE 98

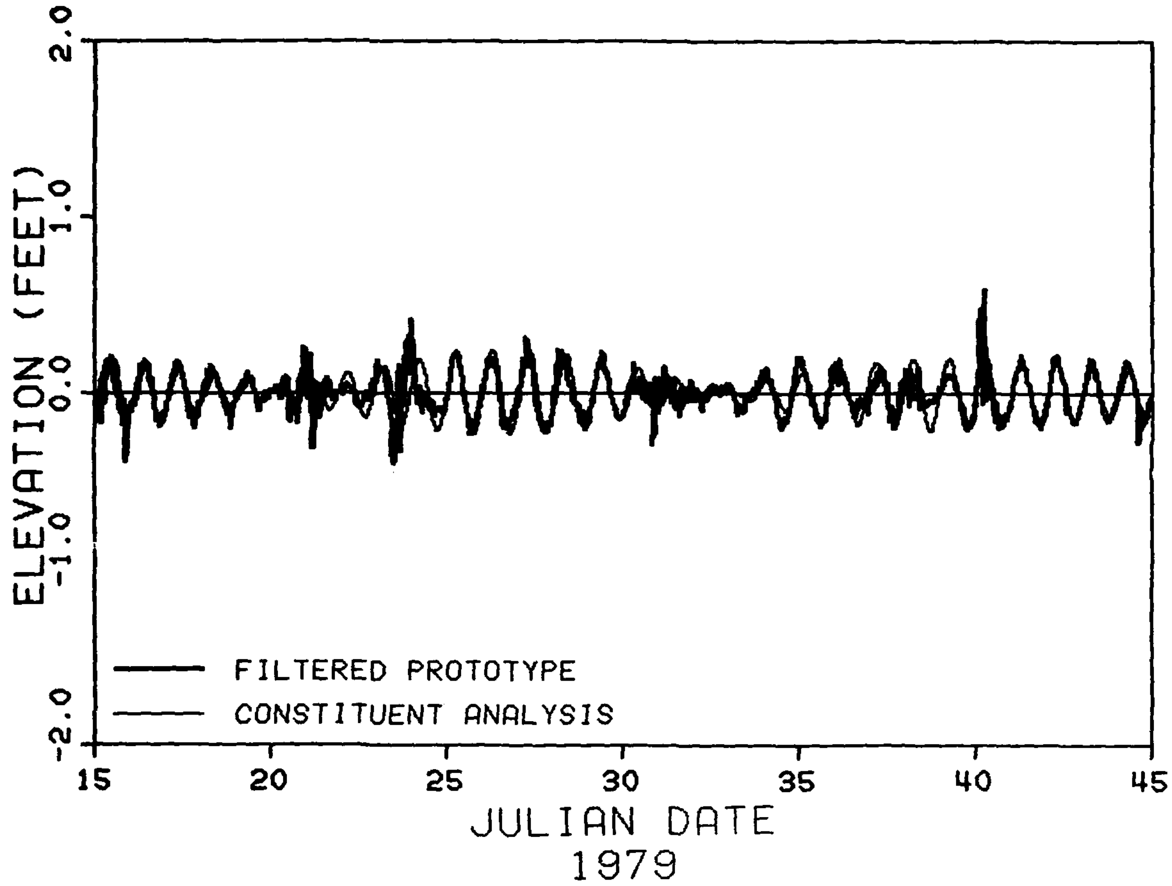


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

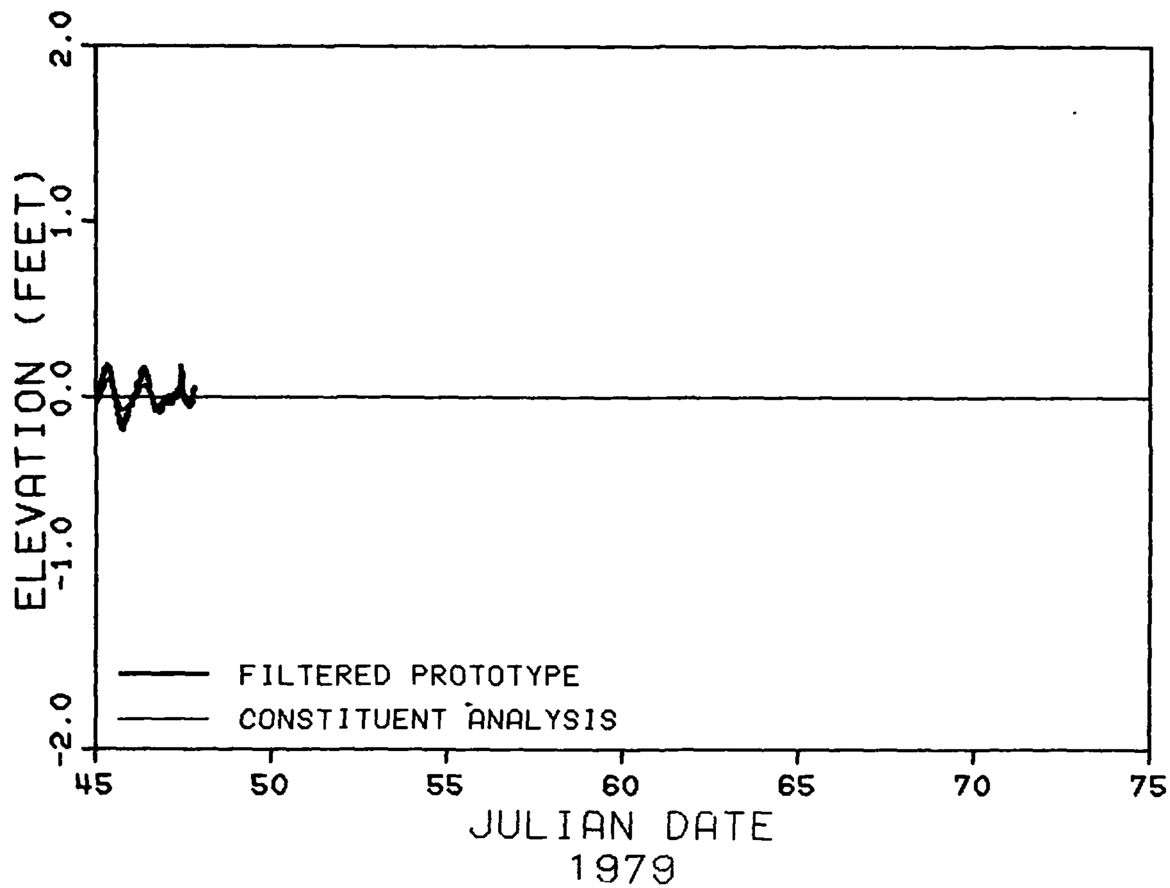
GAGE P-5

DAY 350 1978 TO DAY 15 1979



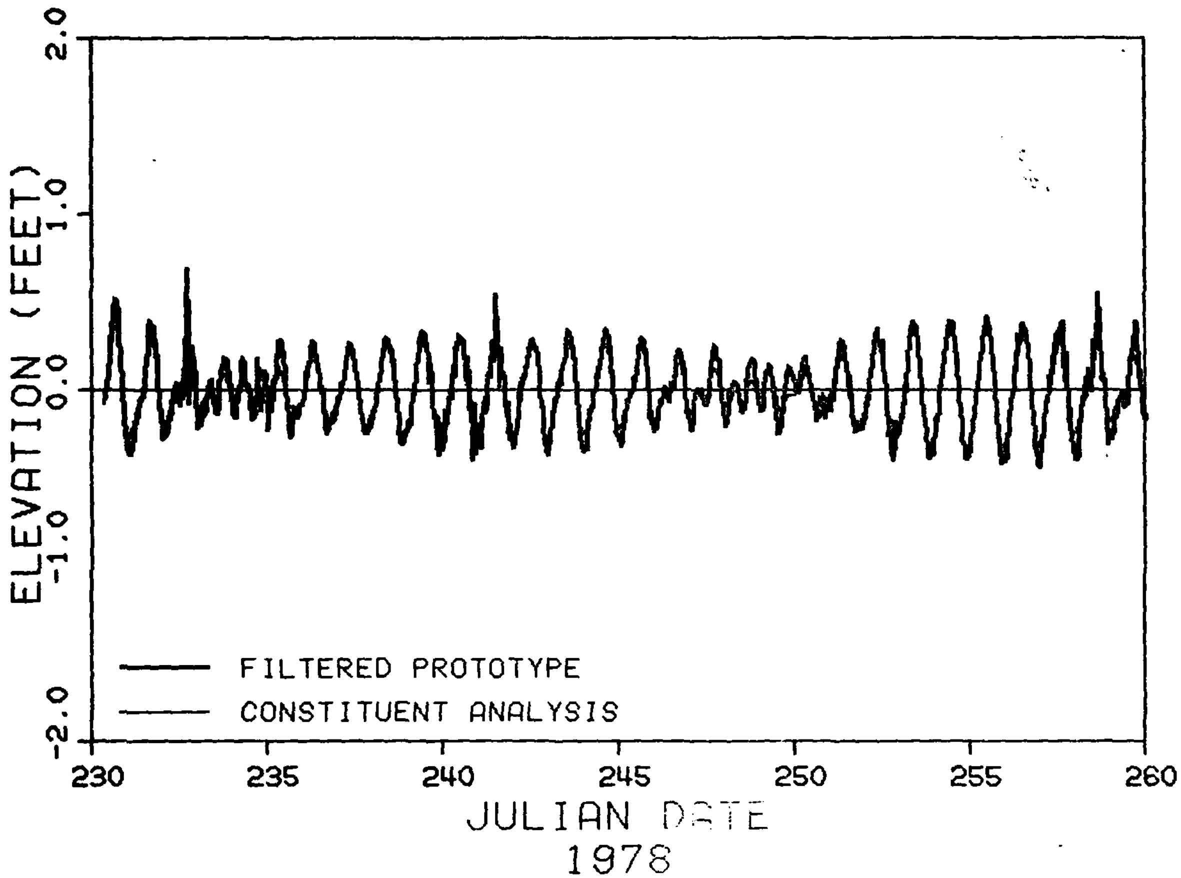
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-5
DAY 15 TO DAY 45 1979



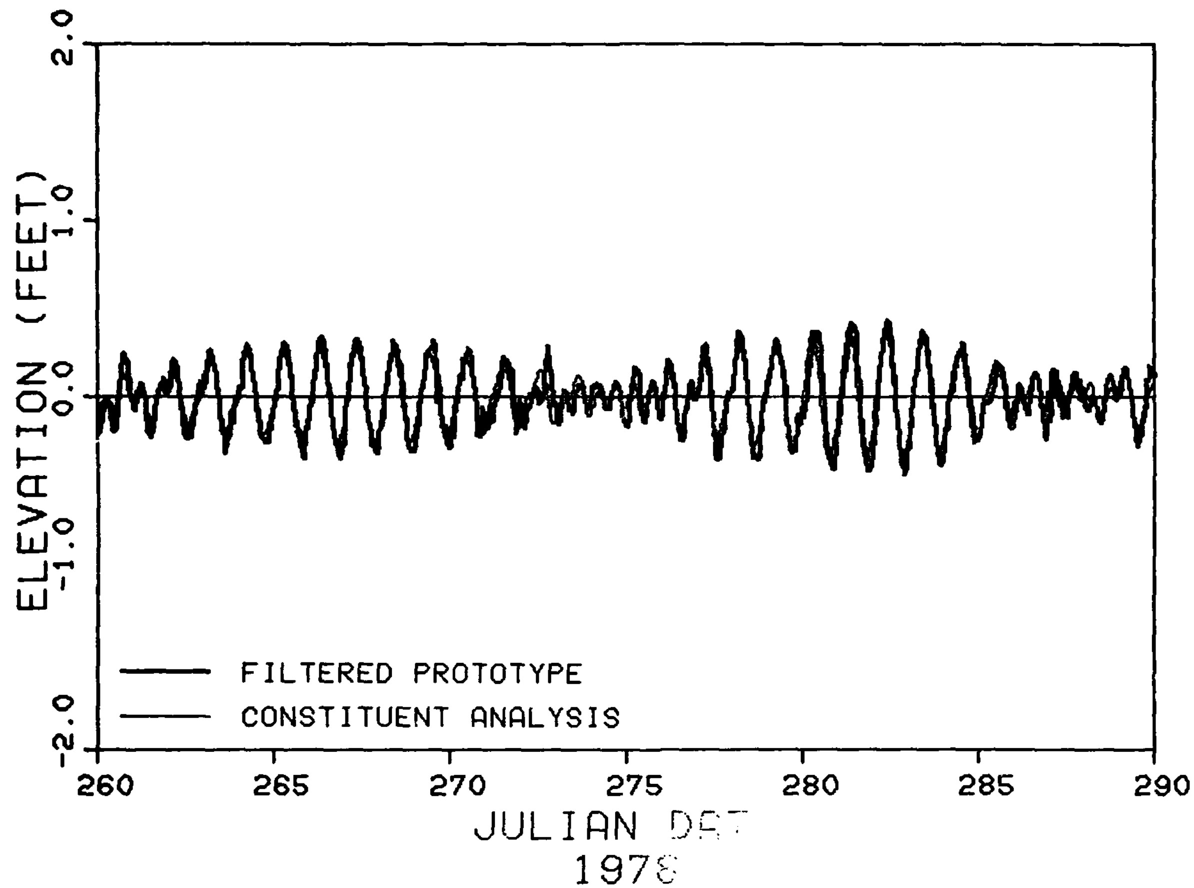
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-5
DAY 45 TO DAY 75 1979



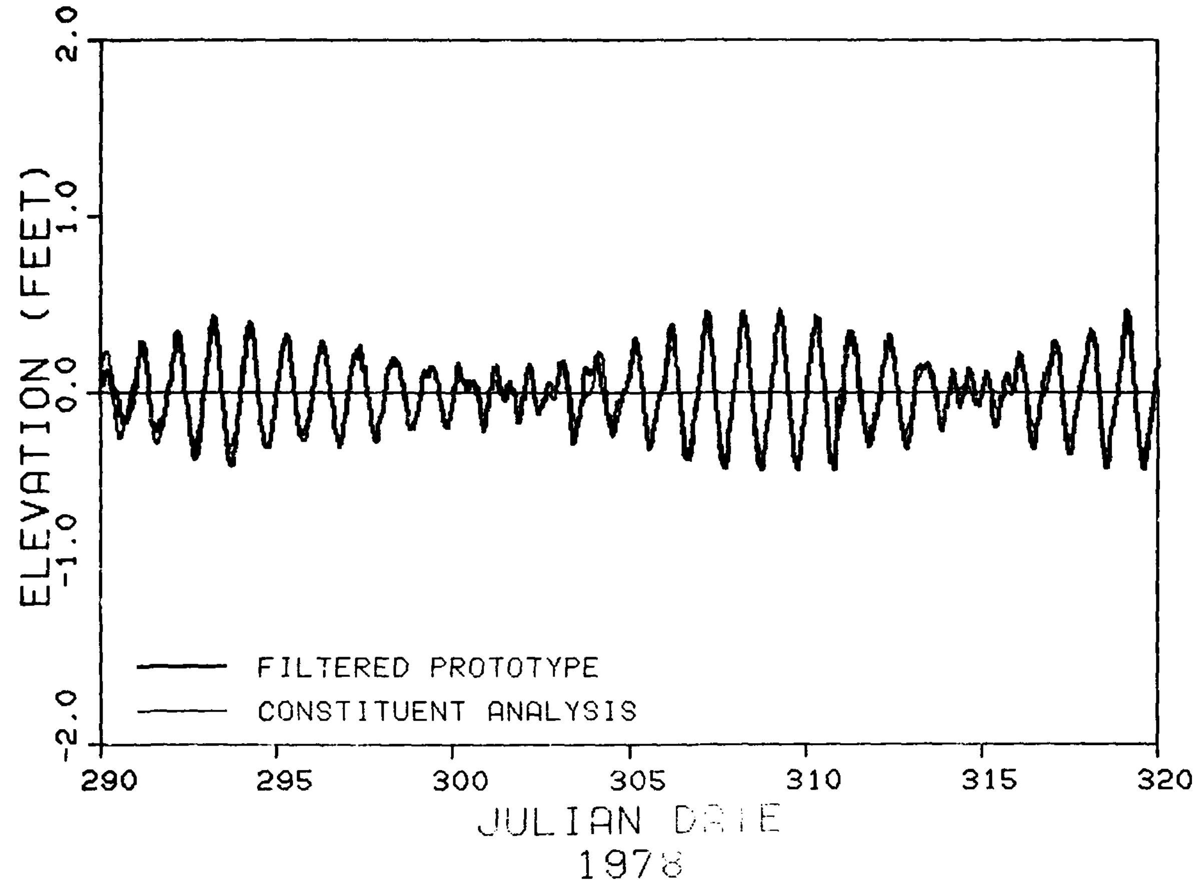
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-6
DAY 230 TO DAY 260 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-6
DAY 260 TO DAY 290 1978

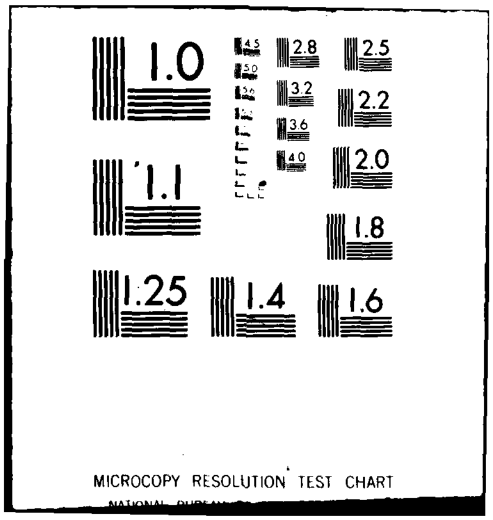


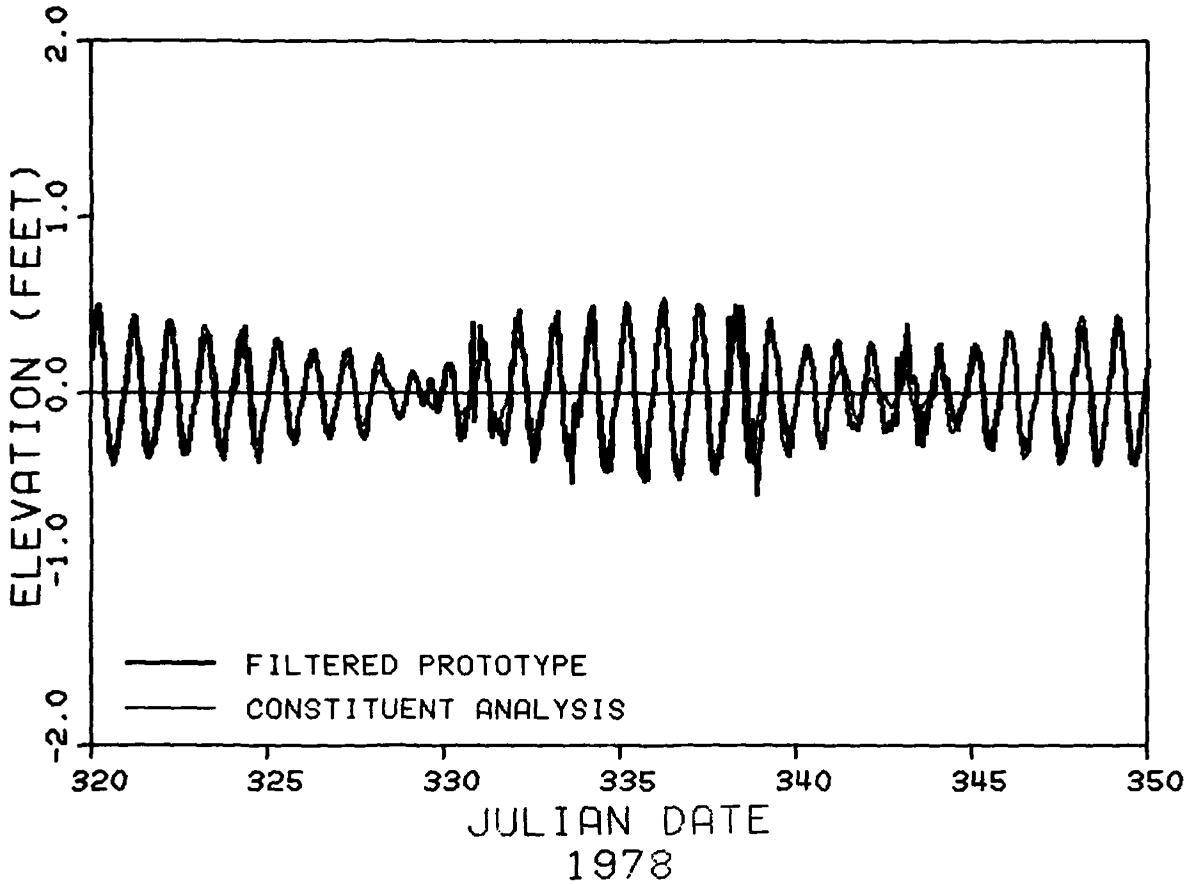
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-6
DAY 290 TO DAY 320 1978

AD-A112 996 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG--ETC F/G 8/8
LAKE PONTCHARTRAIN AND VICINITY HURRICANE PROTECTION PLAN. REPO--ETC(U)
JAN 82 D G OUTLAW
UNCLASSIFIED WES/TR/HL-82-2-1 NL

3 of 7
AD A
112996


1.0
4.5
5.0
5.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.1
1.8
1.25
1.4
1.6
MICROCOPY RESOLUTION TEST CHART

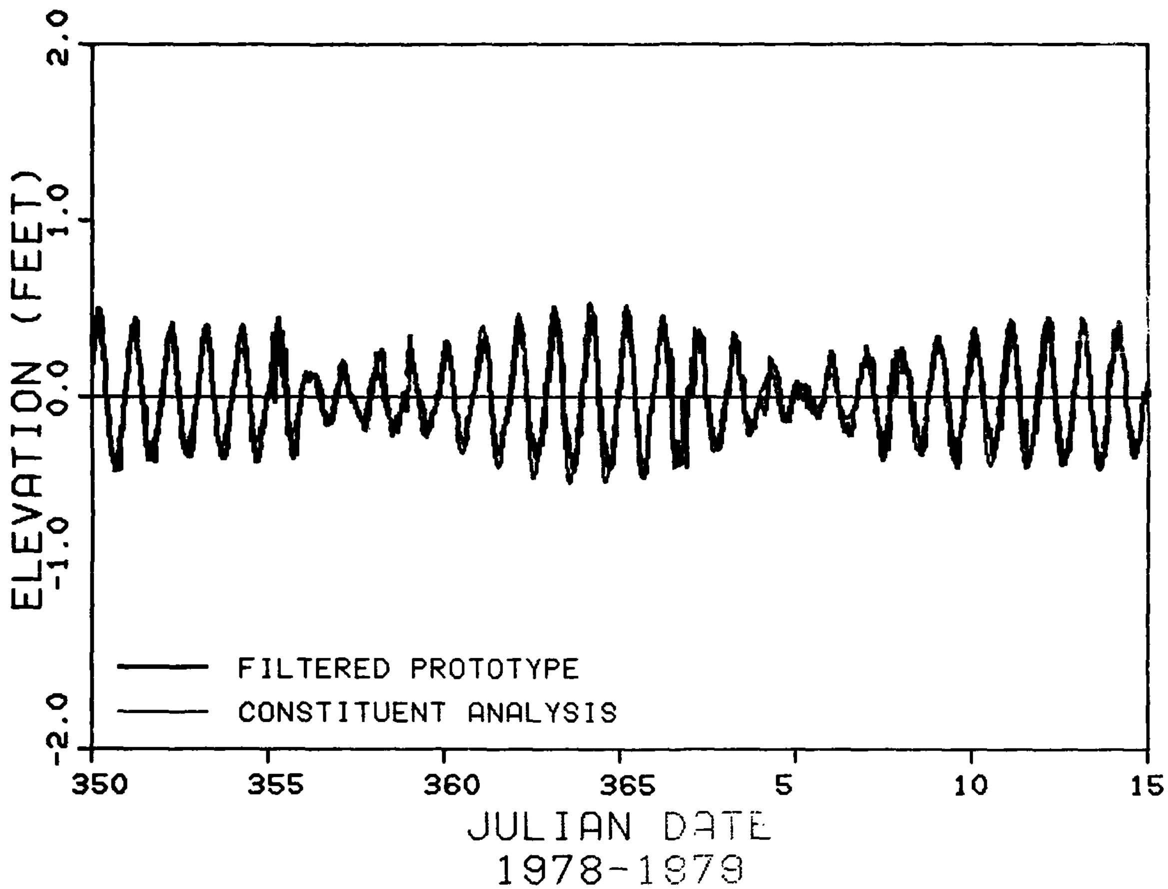


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE P-6

DAY 320 TO DAY 350 1978

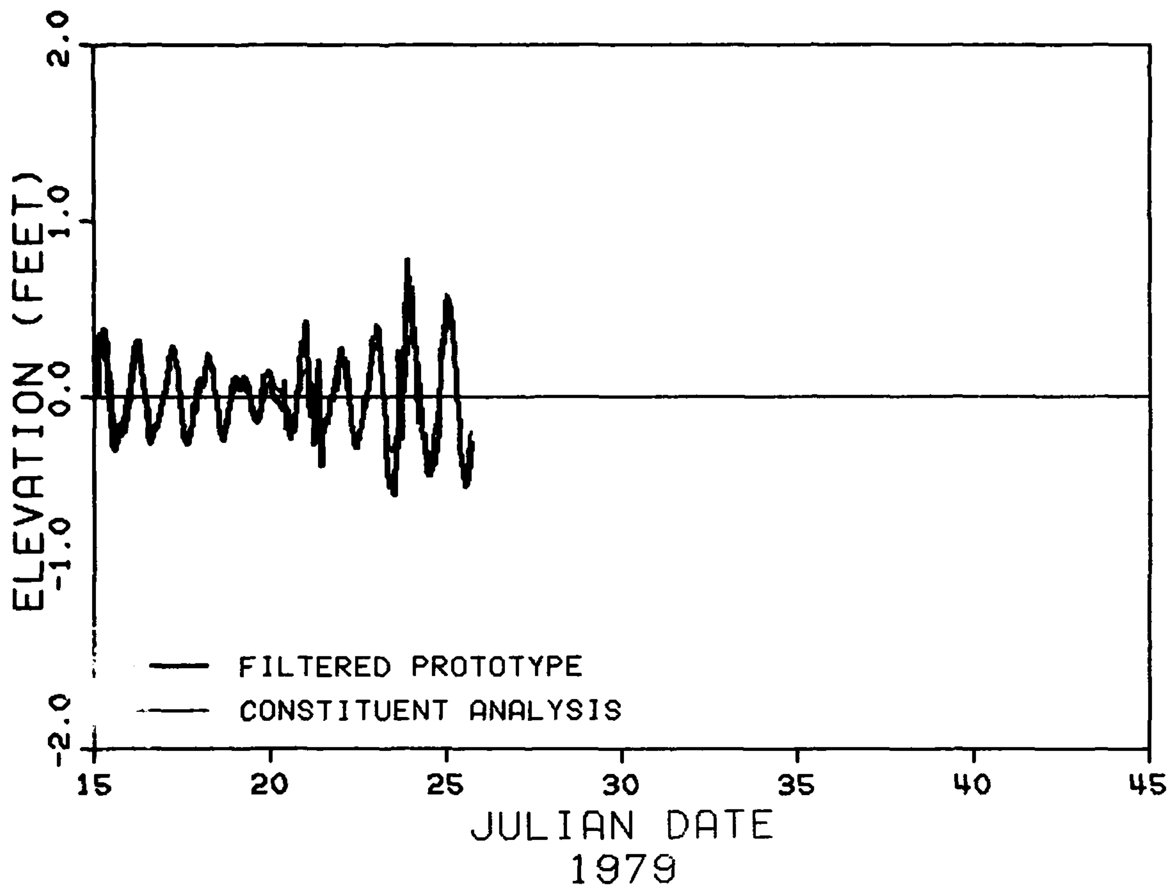


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

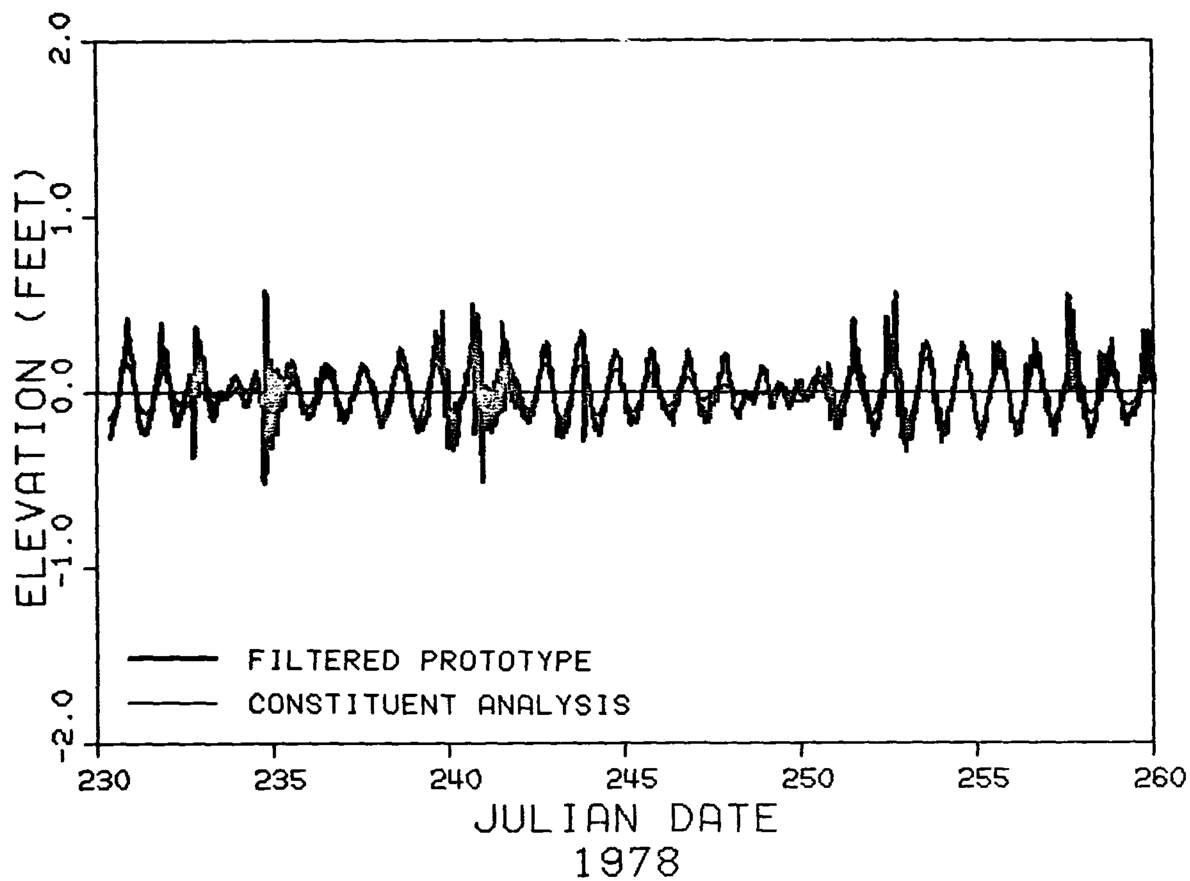
GAGE P-6

DAY 350 1978 TO DAY 15 1979



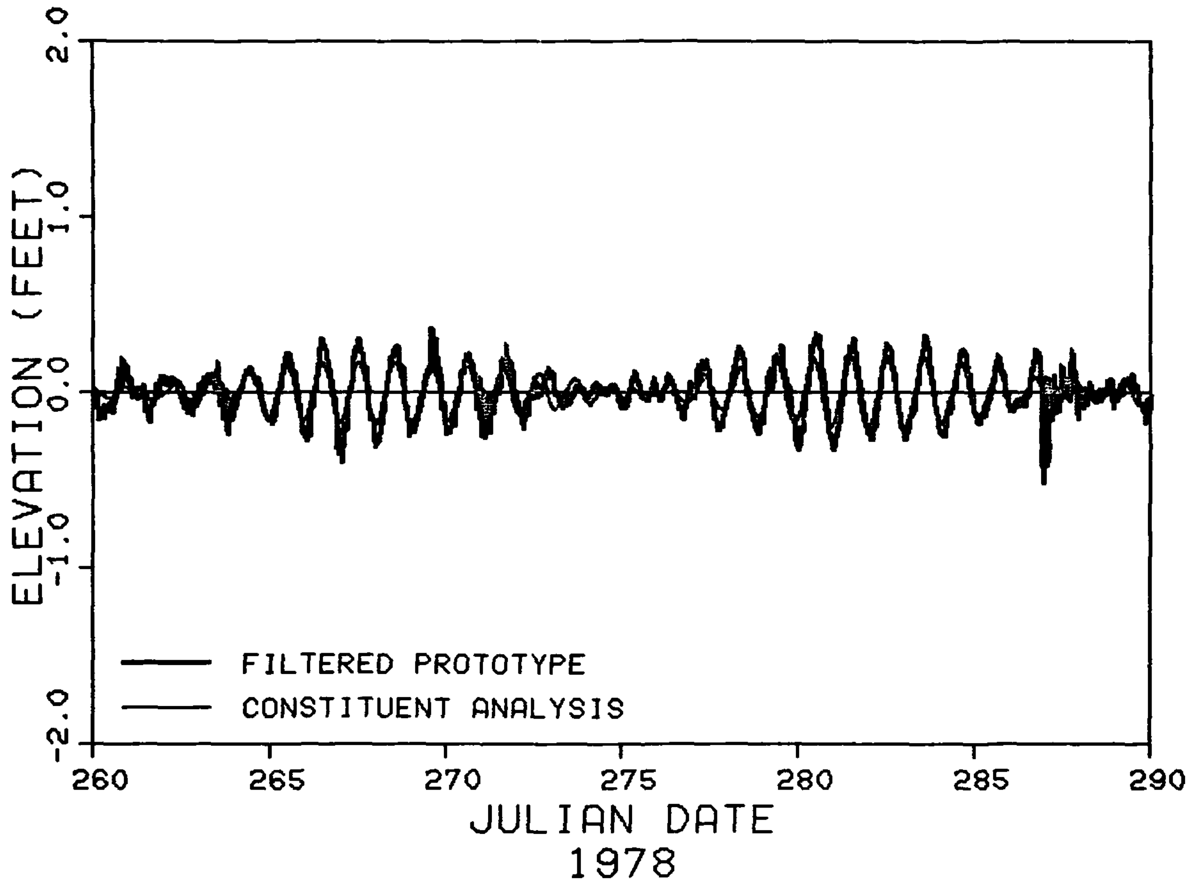
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-6
DAY 15 TO DAY 45 1979



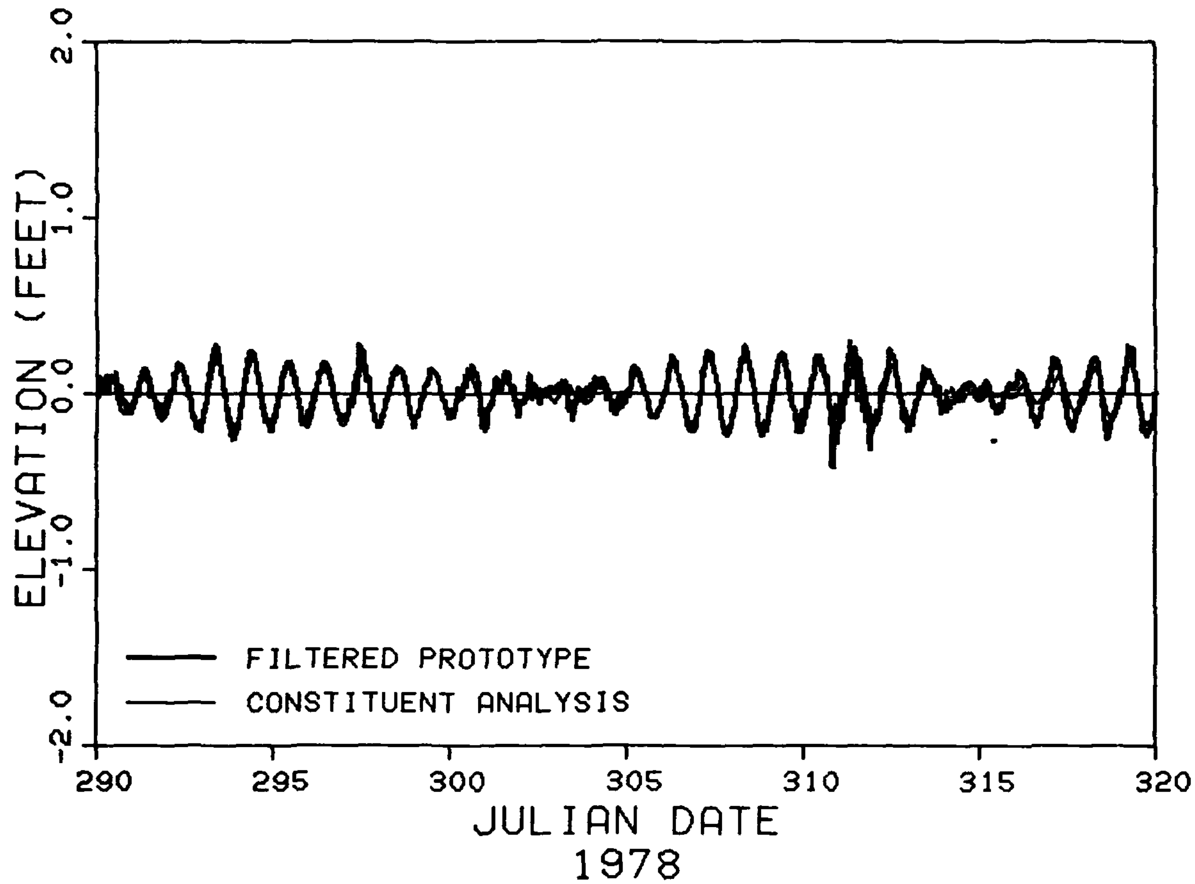
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-7
DAY 230 TO DAY 260 1978



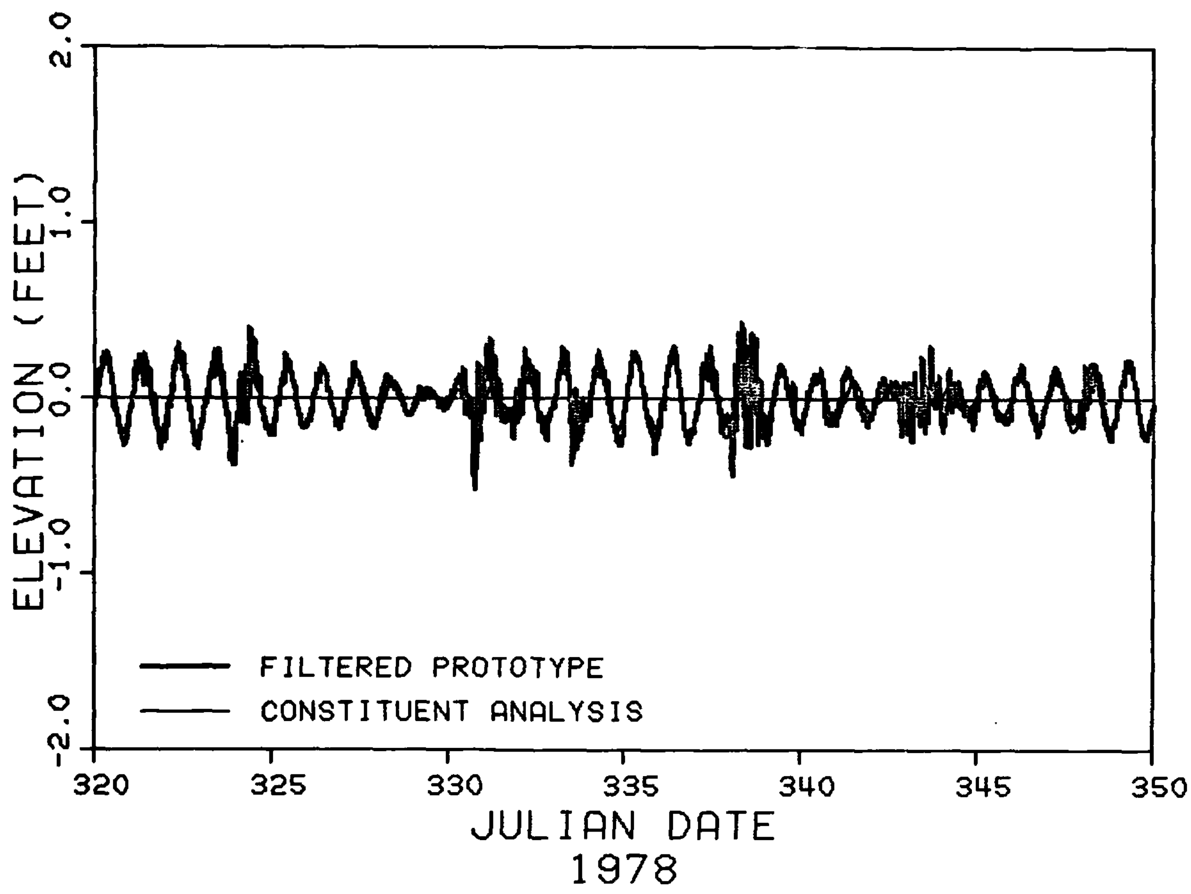
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-7
DAY 260 TO DAY 290 1978



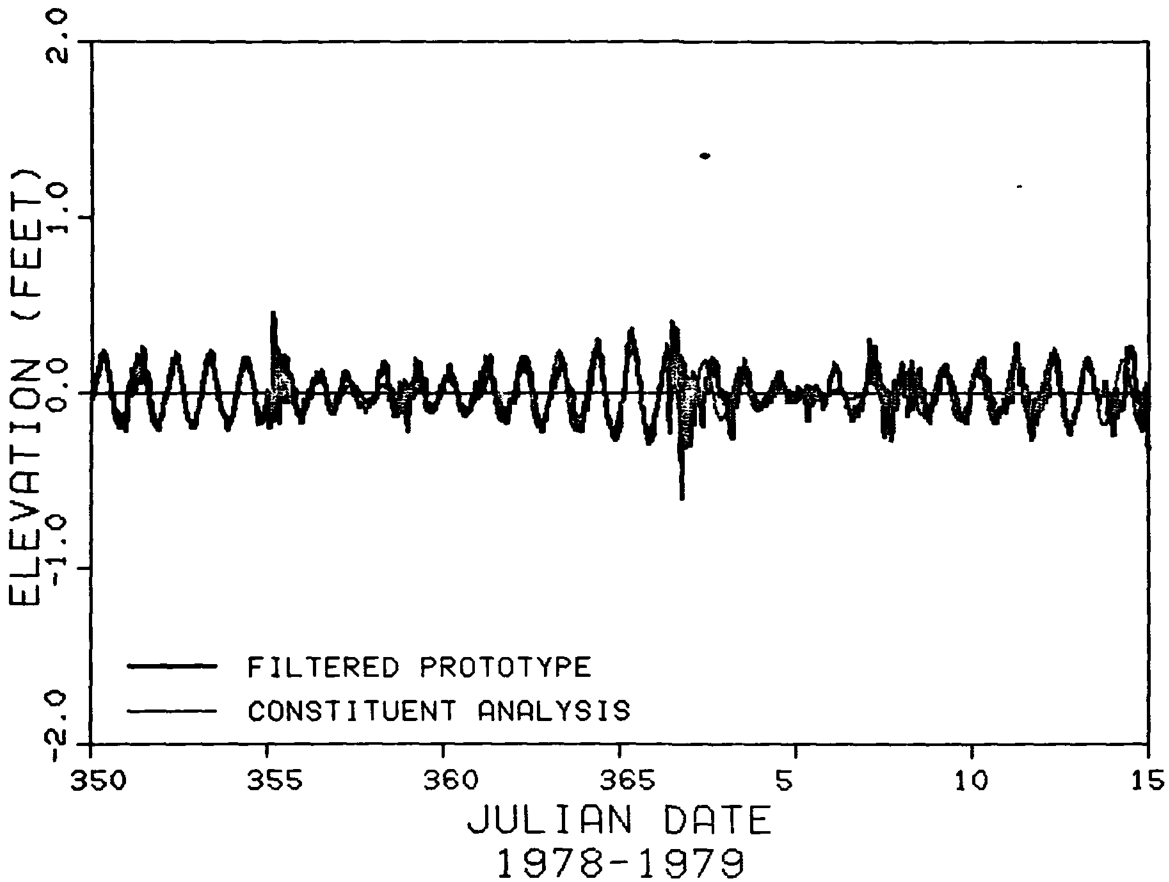
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-7
DAY 290 TO DAY 320 1978



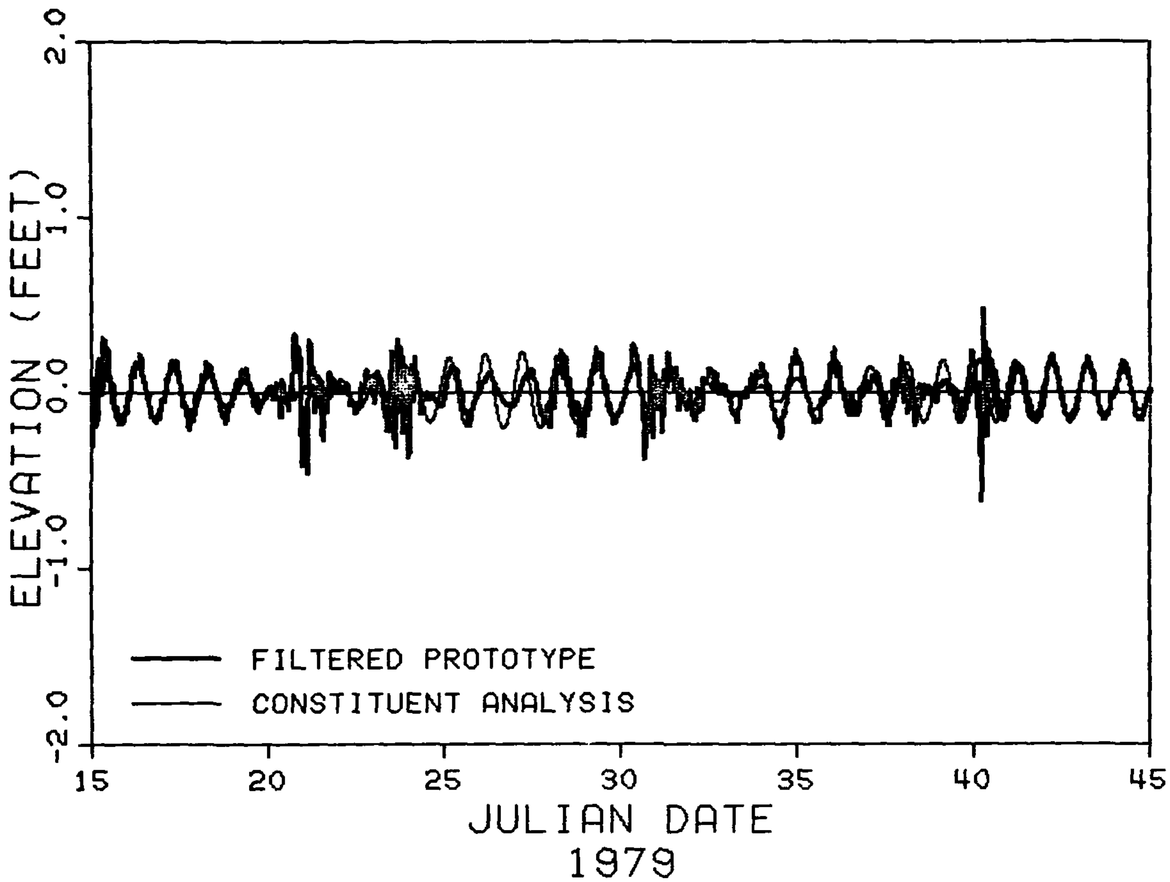
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-7
DAY 320 TO DAY 350 1978



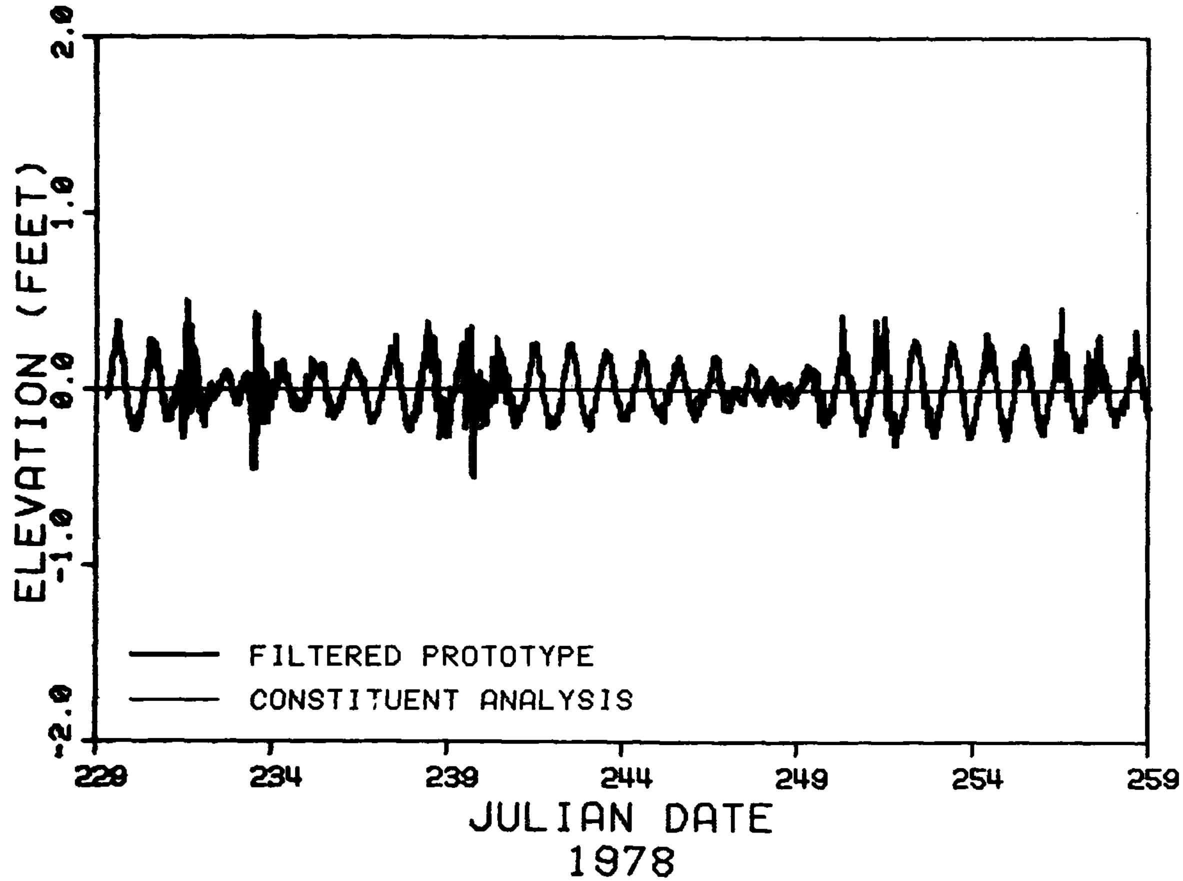
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-7
DAY 350 1978 TO DAY 15 1979



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-7
DAY 15 TO DAY 45 1979

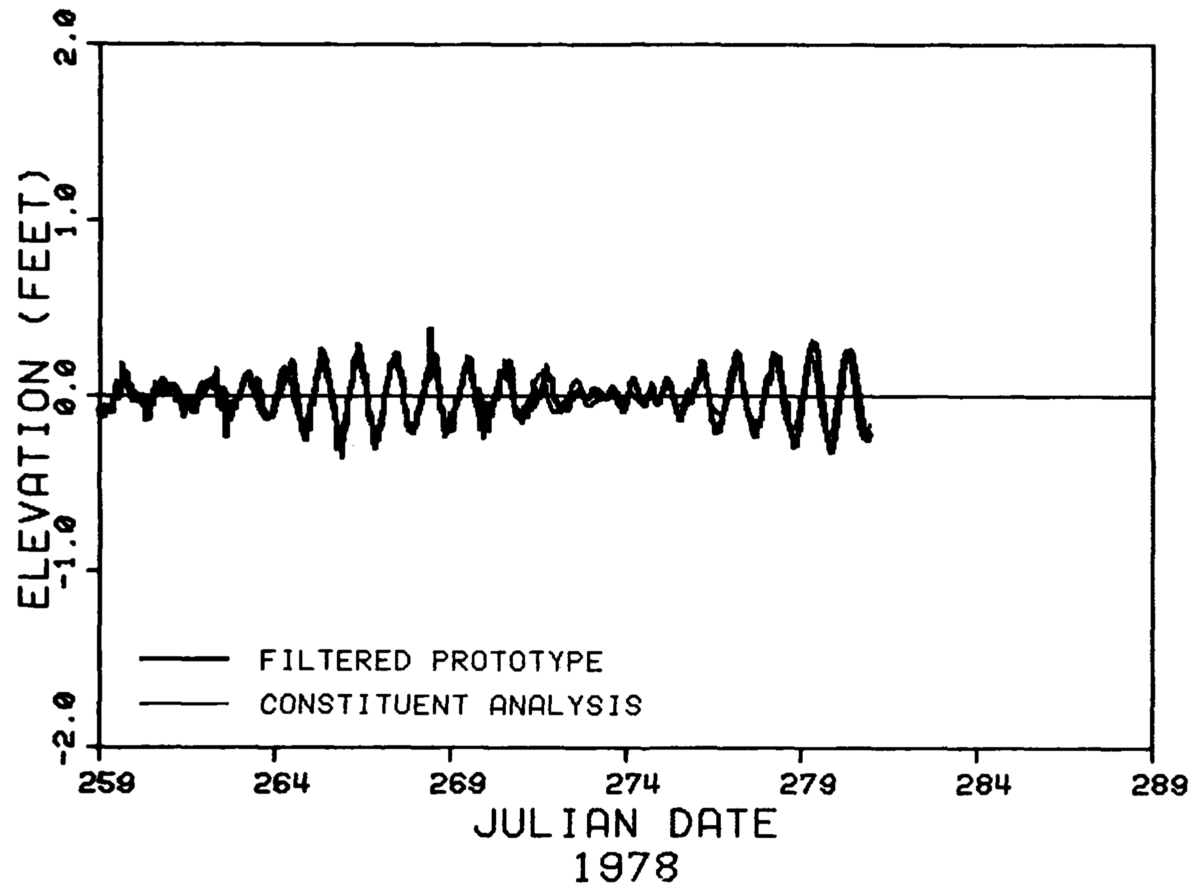


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

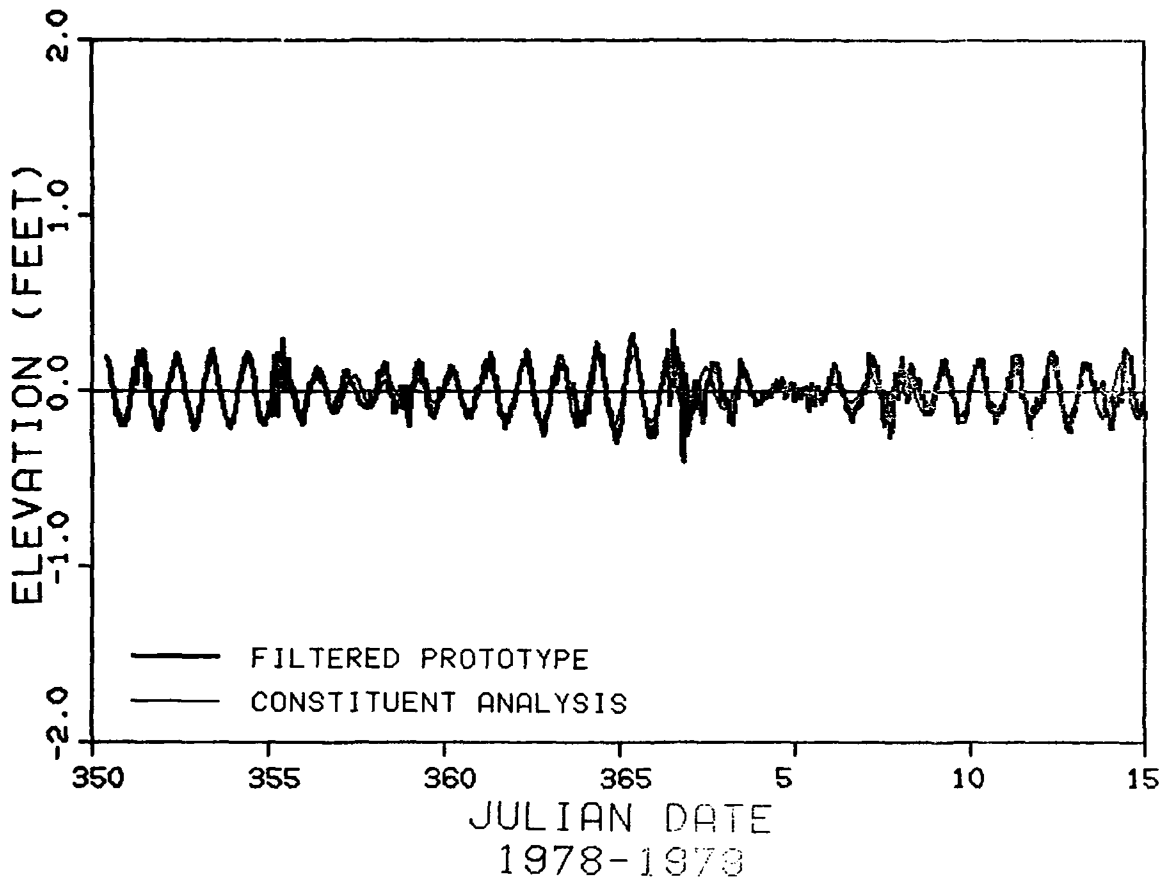
GAGE P-8

DAY 229 TO DAY 259 1978



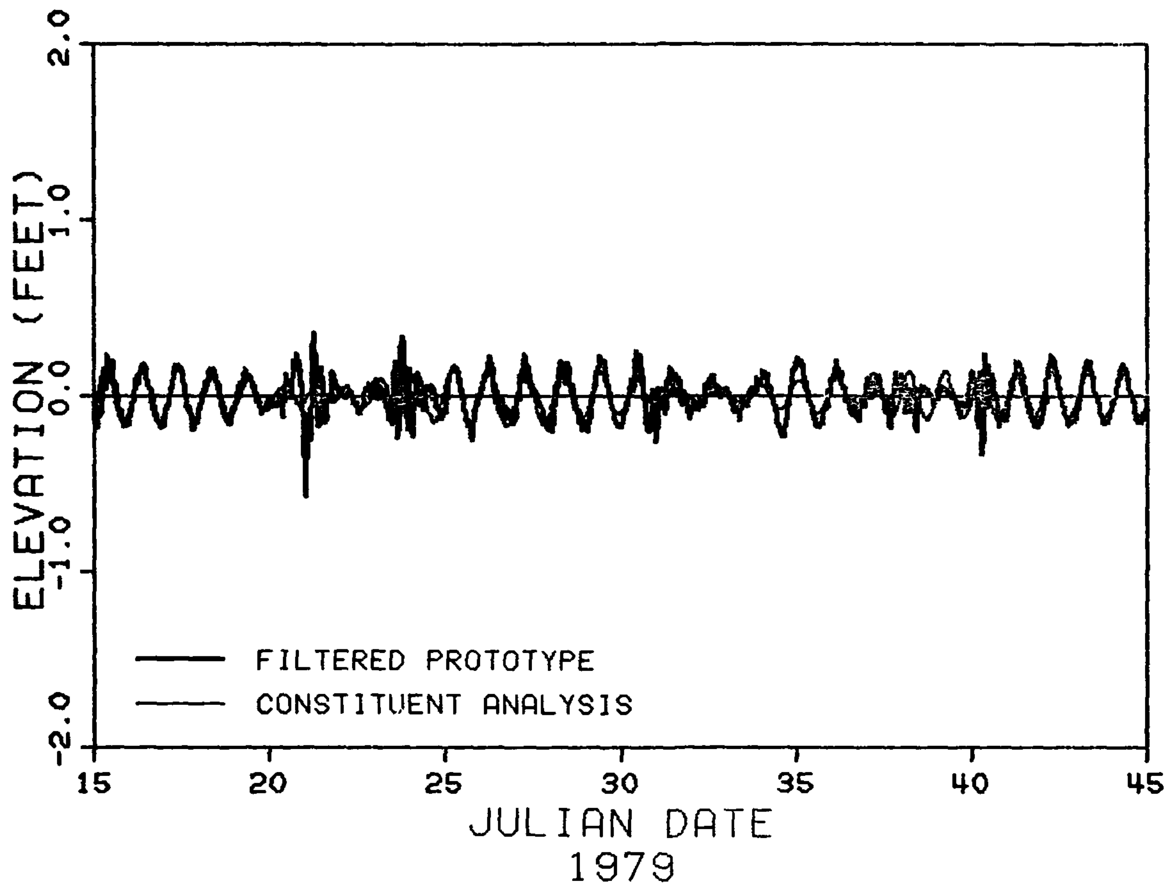
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-8
DAY 259 TO DAY 289 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE P-9
DAY 350 1978 TO DAY 15 1979

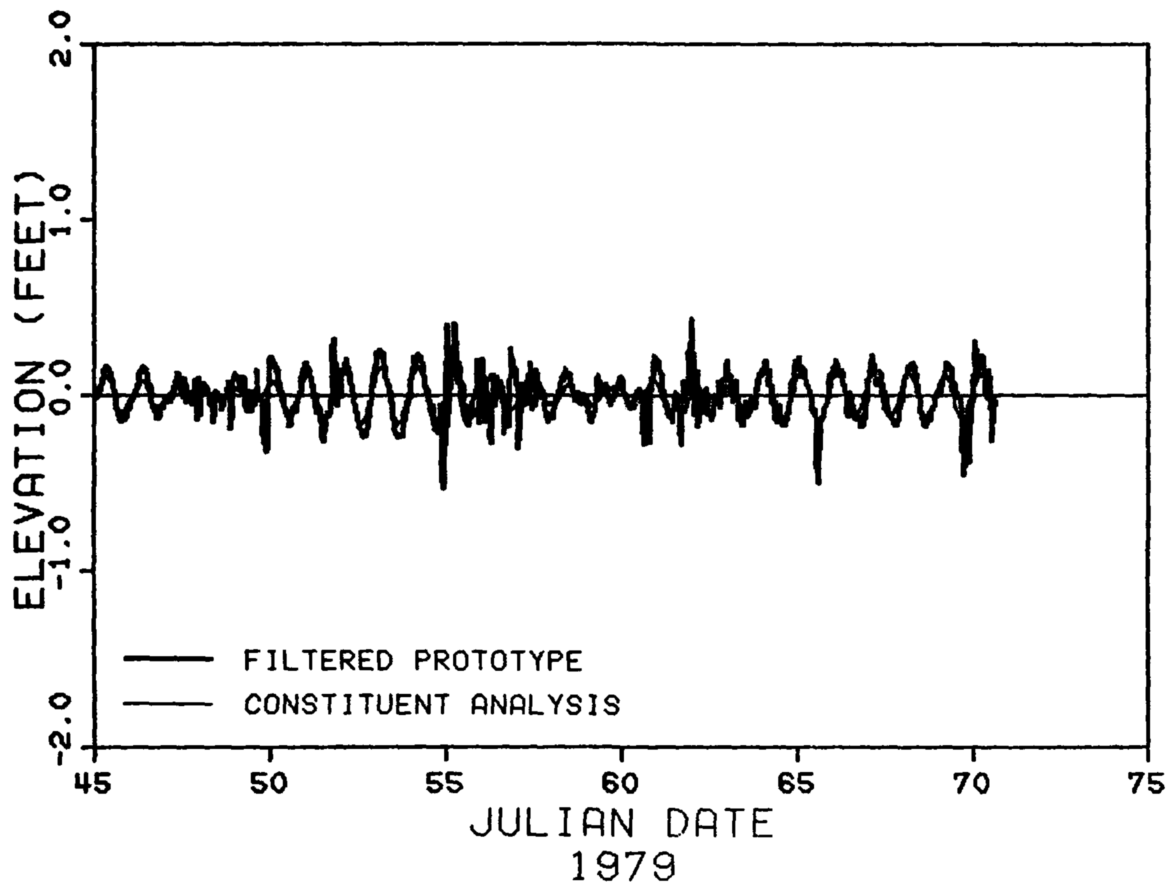


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE P-9

DAY 15 TO DAY 45 1979

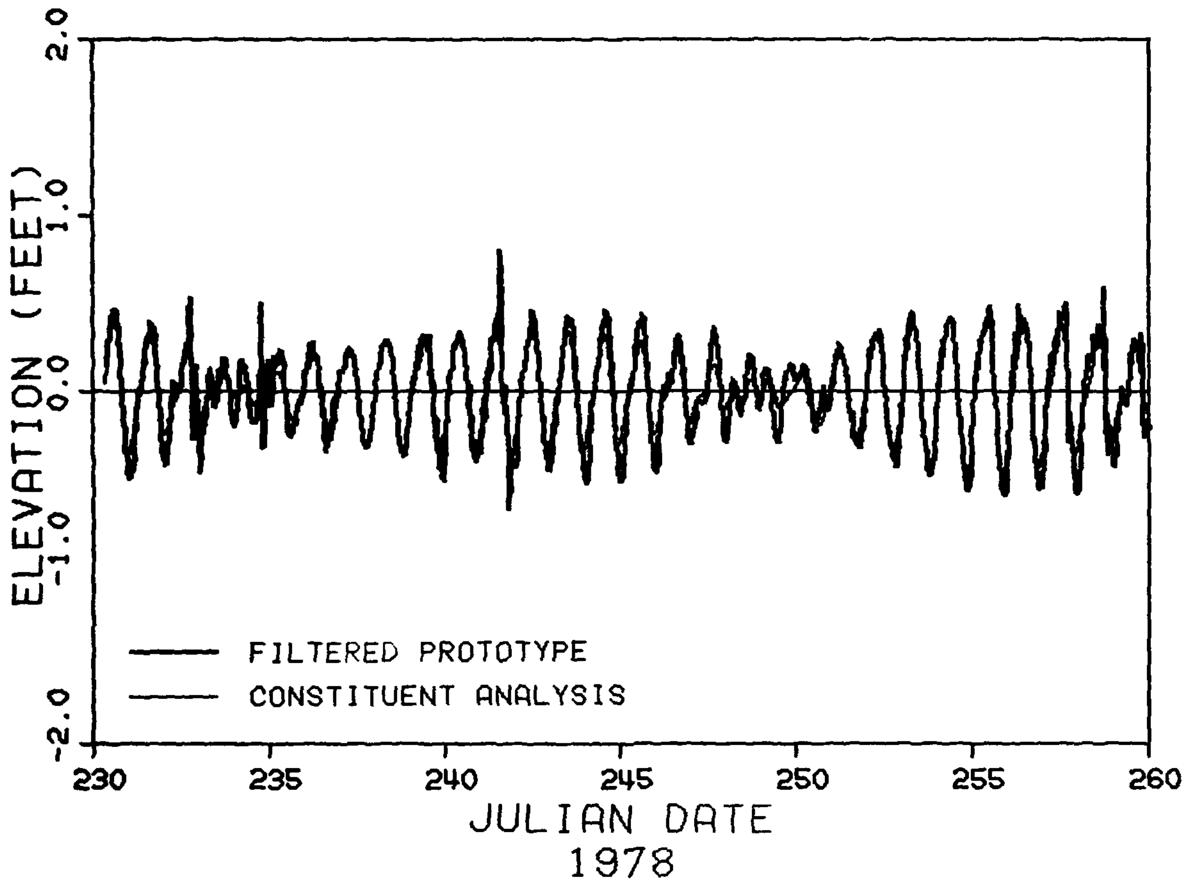


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

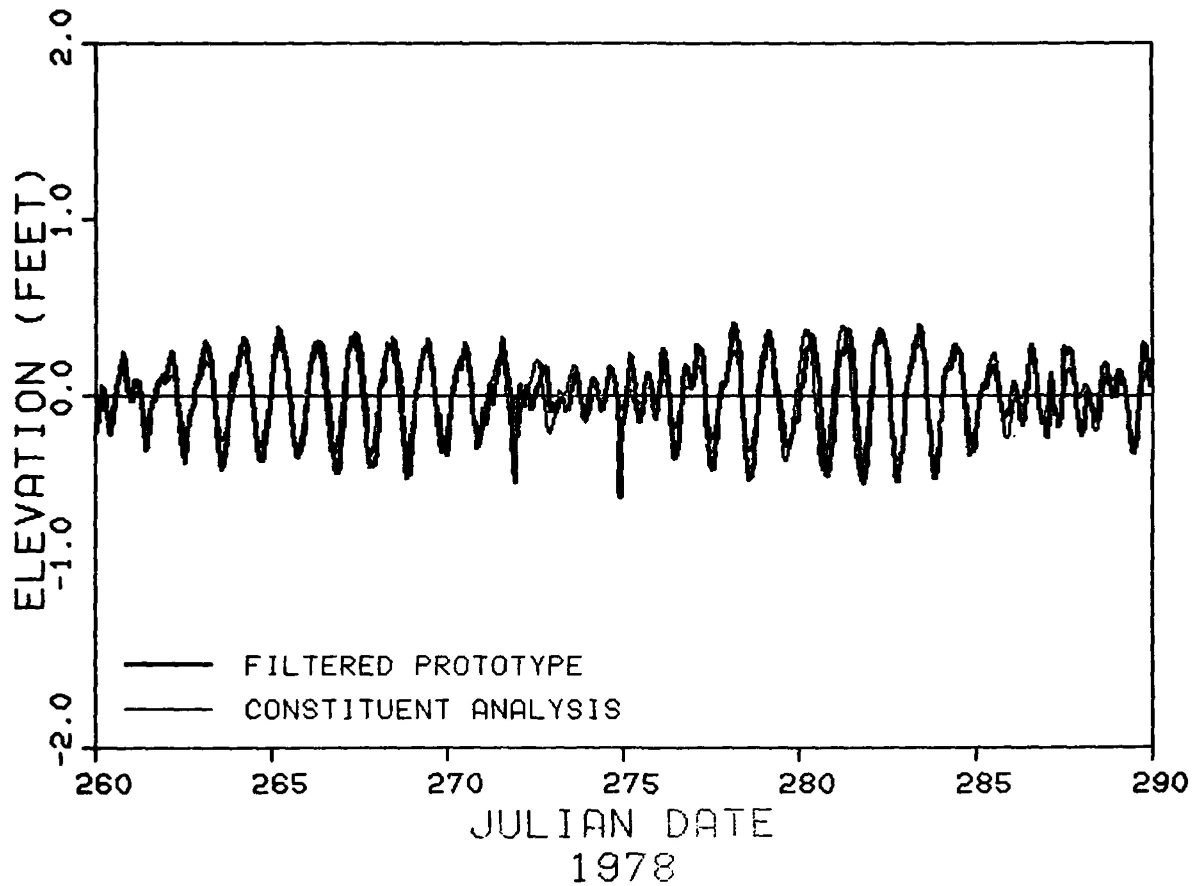
GAGE P-9

DAY 45 TO DAY 75 1979



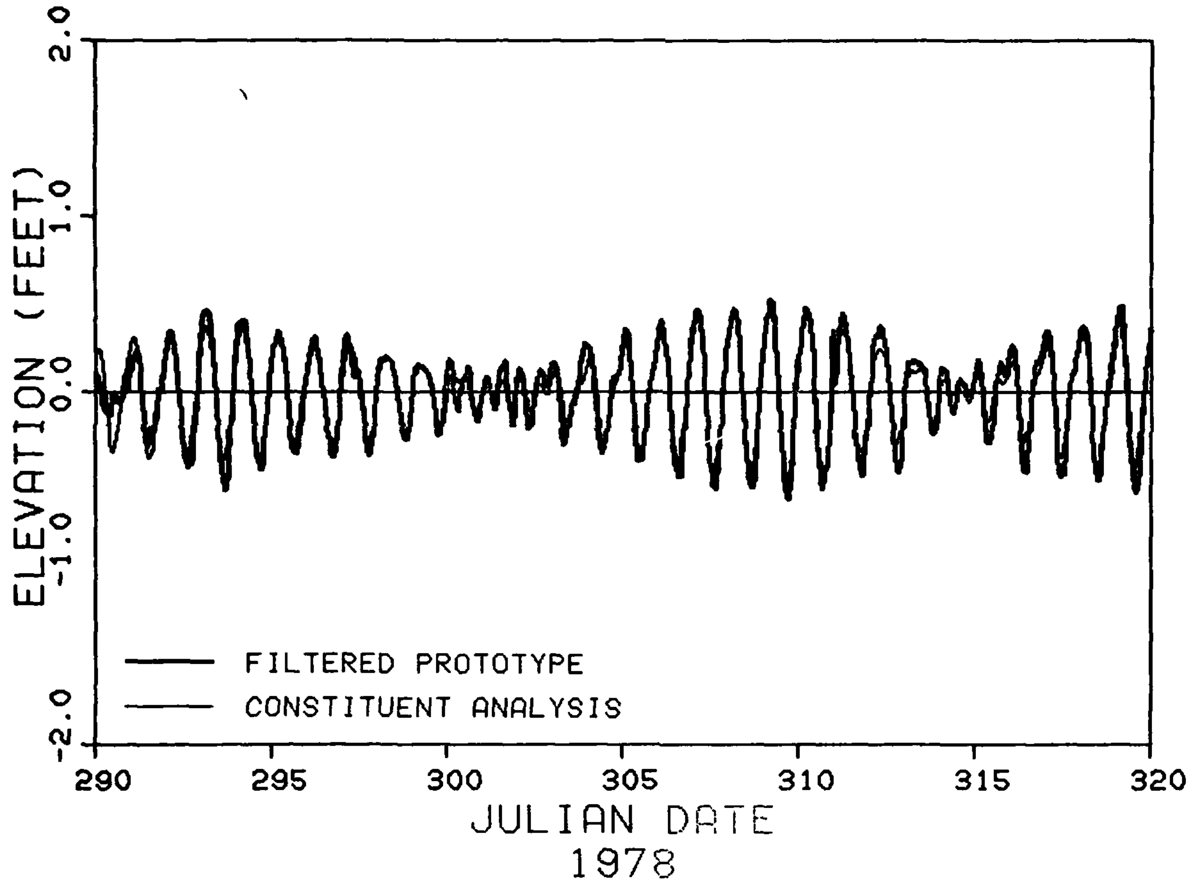
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE R-1
DAY 230 TO DAY 260 1978



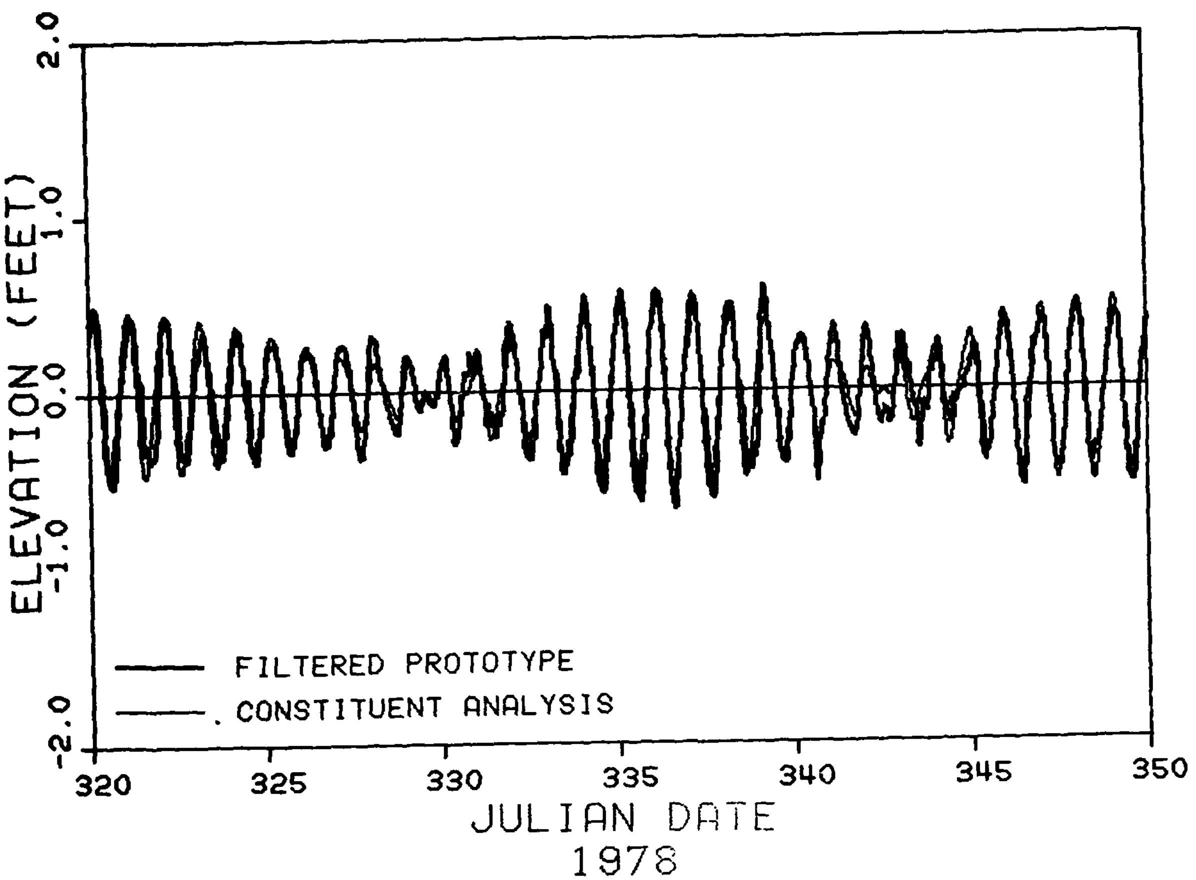
NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE R-1
DAY 260 TO DAY 290 1978



NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS
GAGE R-1
DAY 290 TO DAY 320 1978

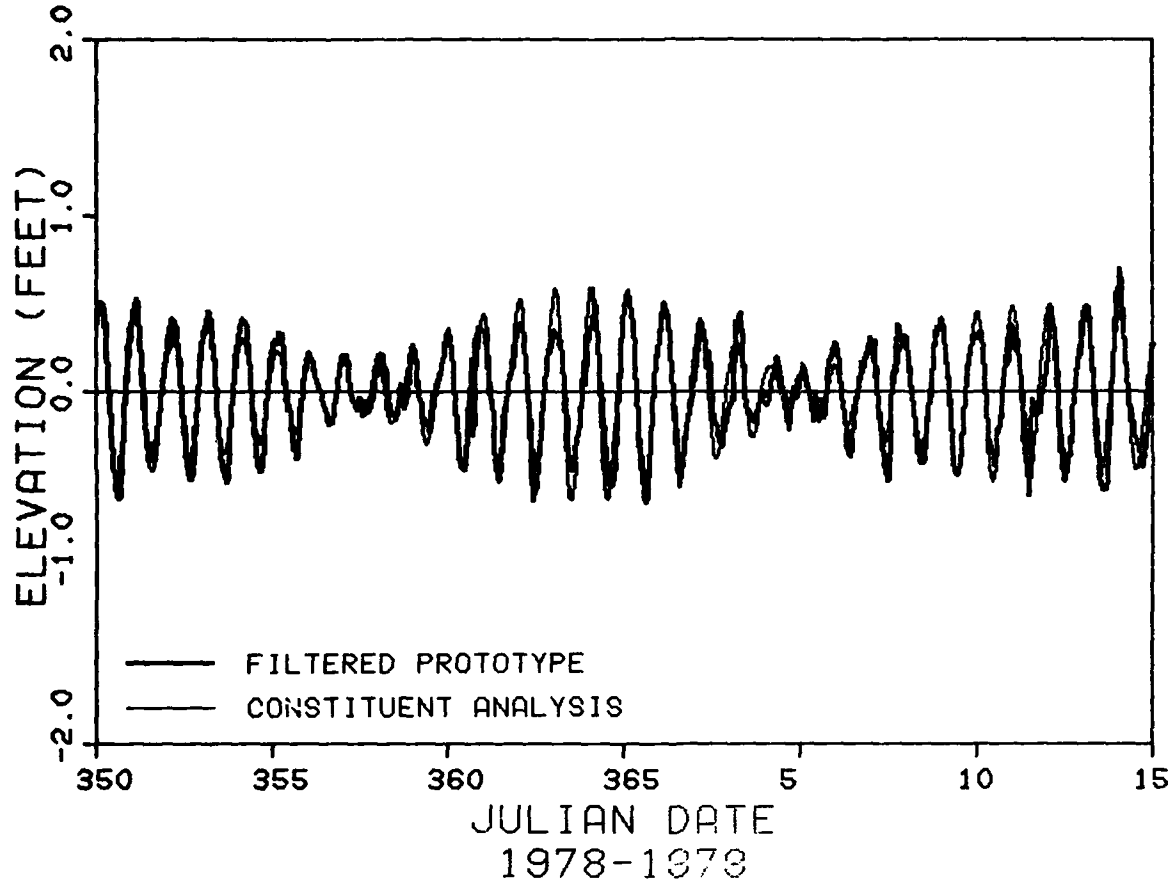


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE R-1

DAY 320 TO DAY 350 1978

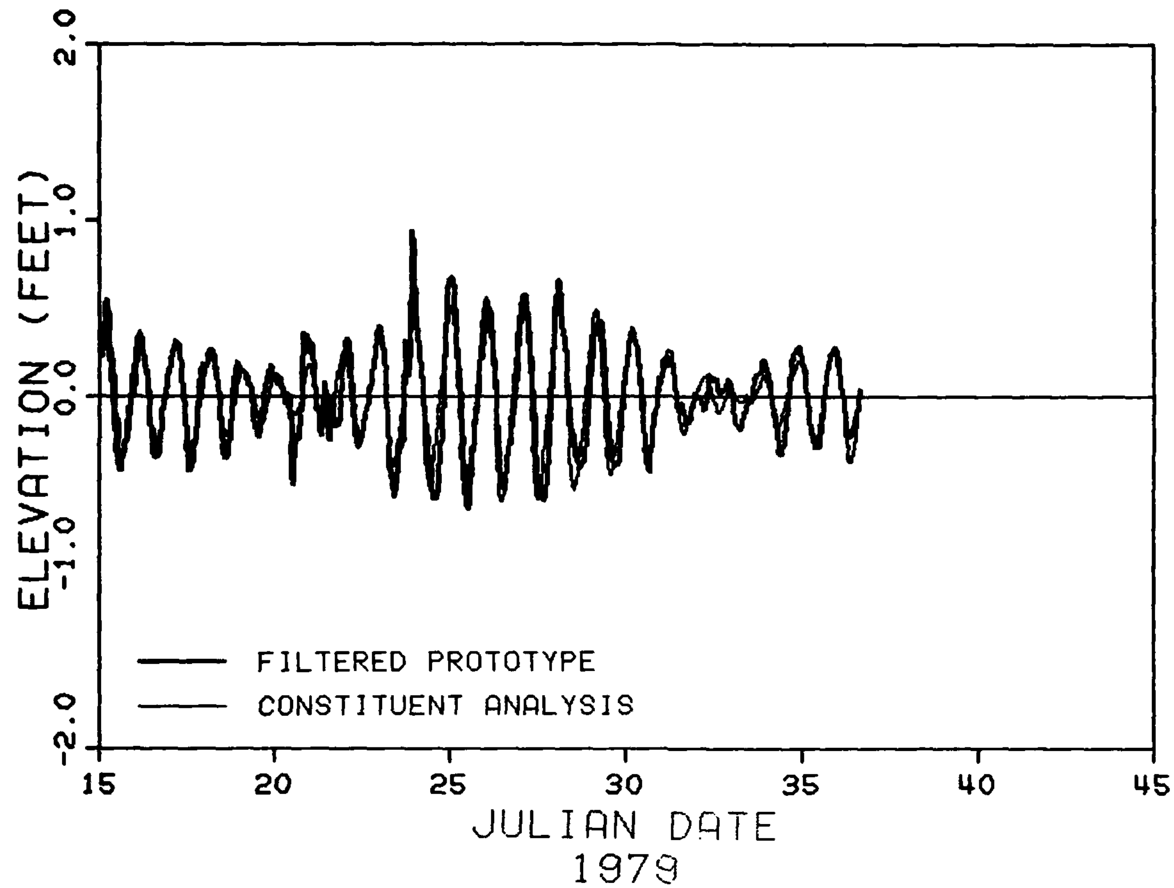


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE R-1

DAY 350 1978 TO DAY 15 1979

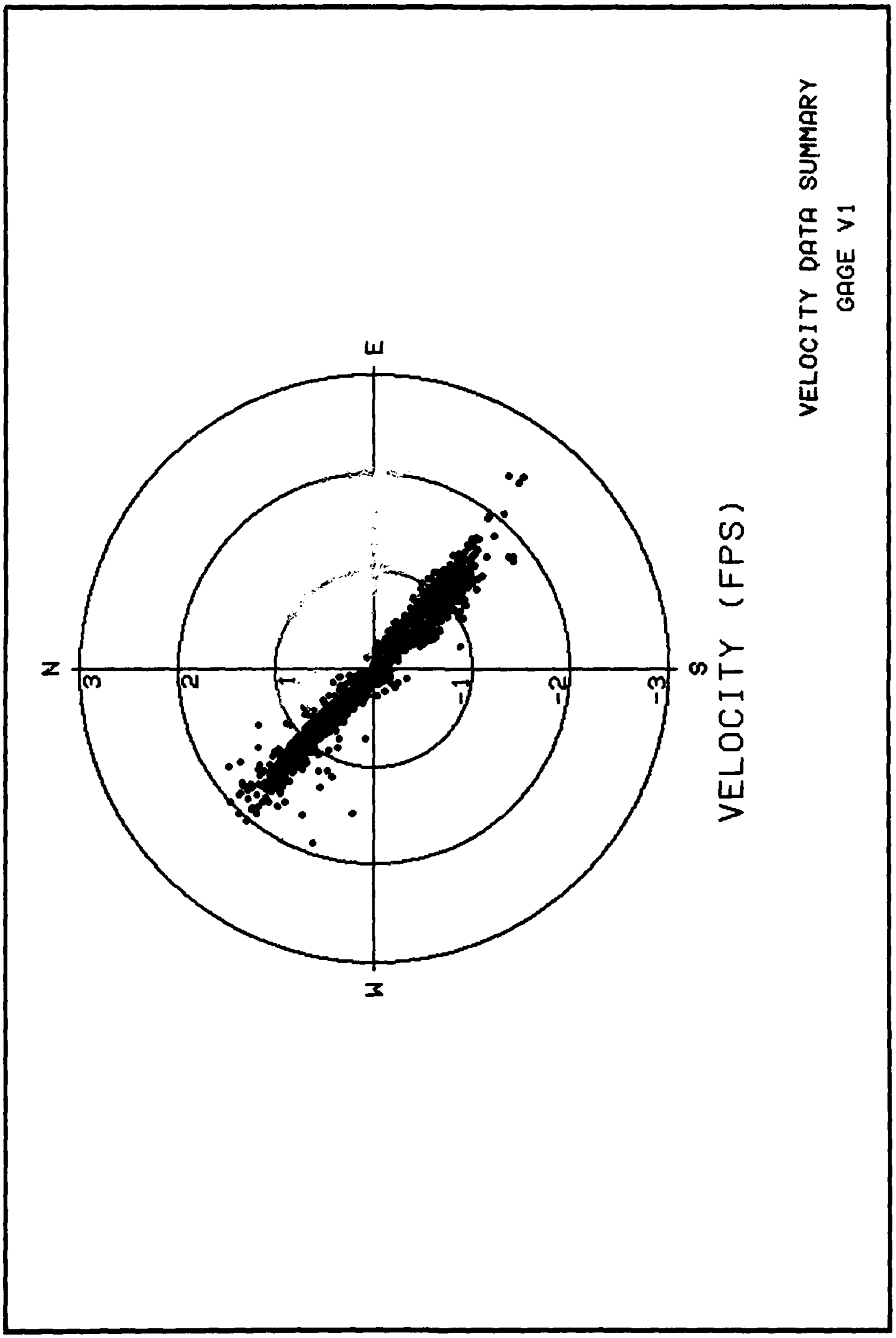


NOTE: ZERO ELEVATION REFERENCE OF THE FILTERED PROTOTYPE DATA IS THE MEAN OF THE RECORD.

TIDAL ELEVATION ANALYSIS

GAGE R-1

DAY 15 TO DAY 45 1979


VELOCITY DATA SUMMARY
GAGE V1
VELOCITY (FPS)
N
S
E
W
3
2
1
-1
-2
-3

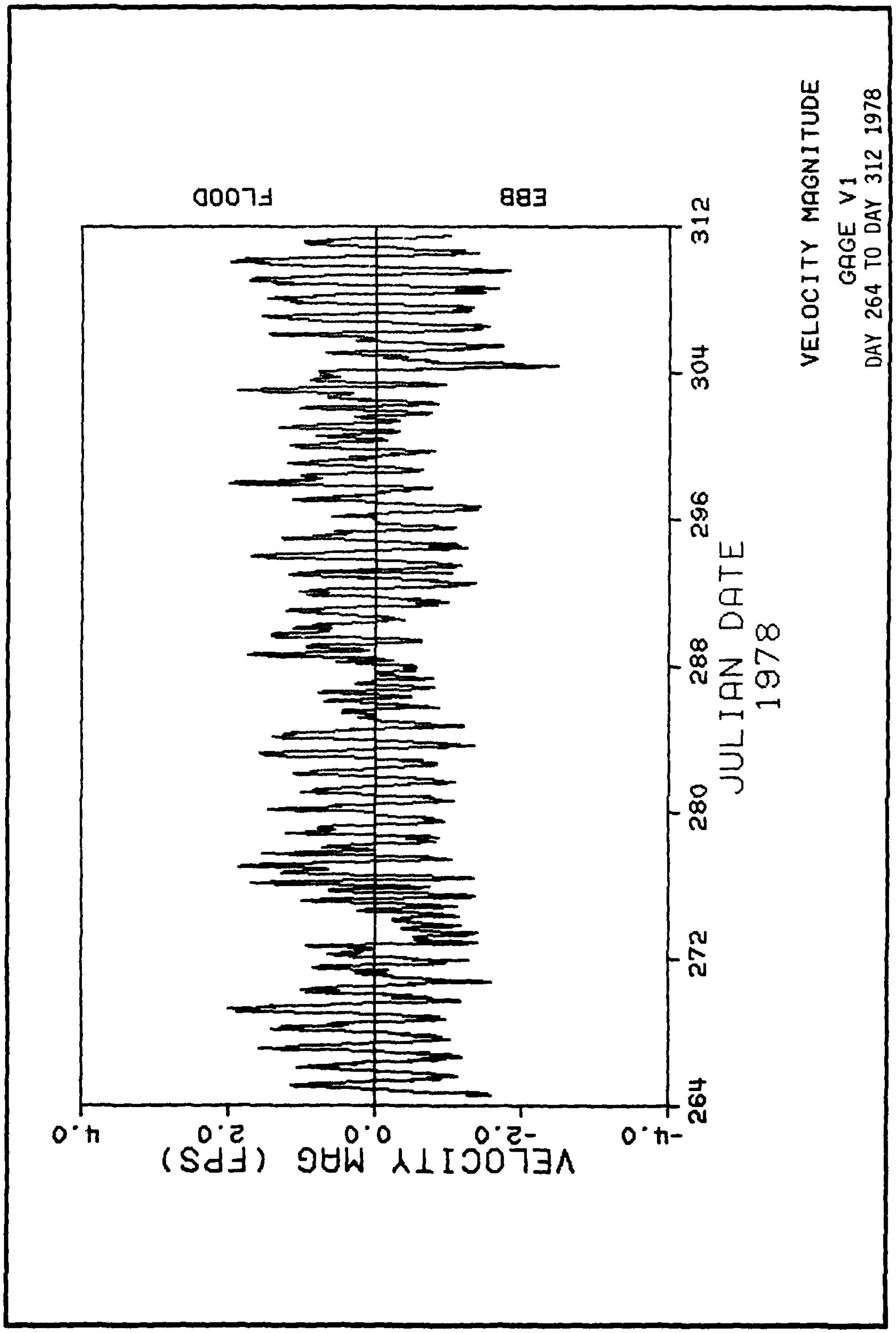

VELOCITY MAGNITUDE
GAGE V1
DAY 264 TO DAY 312 1978
FLOOD
EBB
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312
JULIAN DATE
1978

PLATE 126

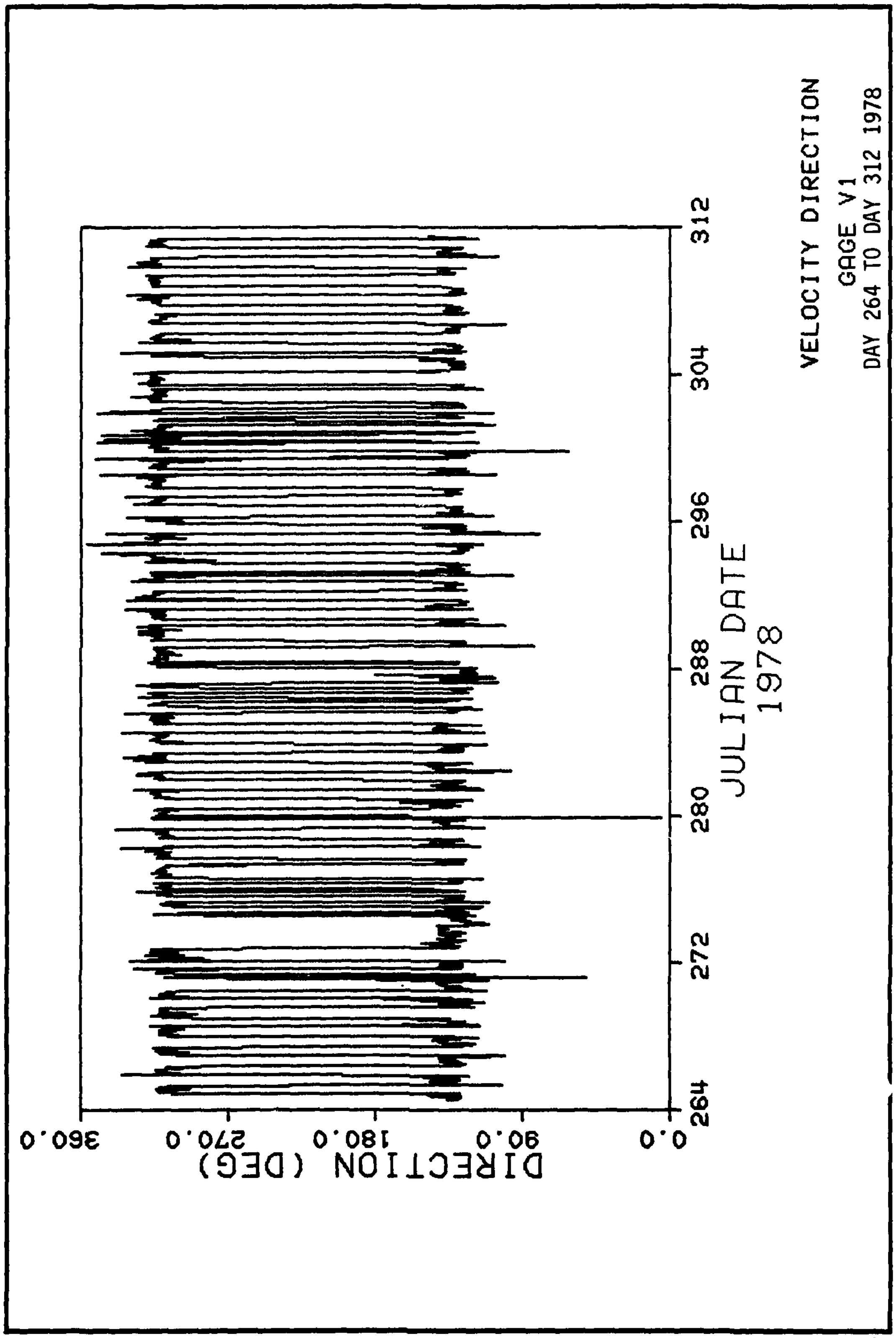

VELOCITY DIRECTION
GAGE V1
DAY 264 TO DAY 312 1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
JULIAN DATE
1978
264
272
280
288
296
304
312

PLATE 127

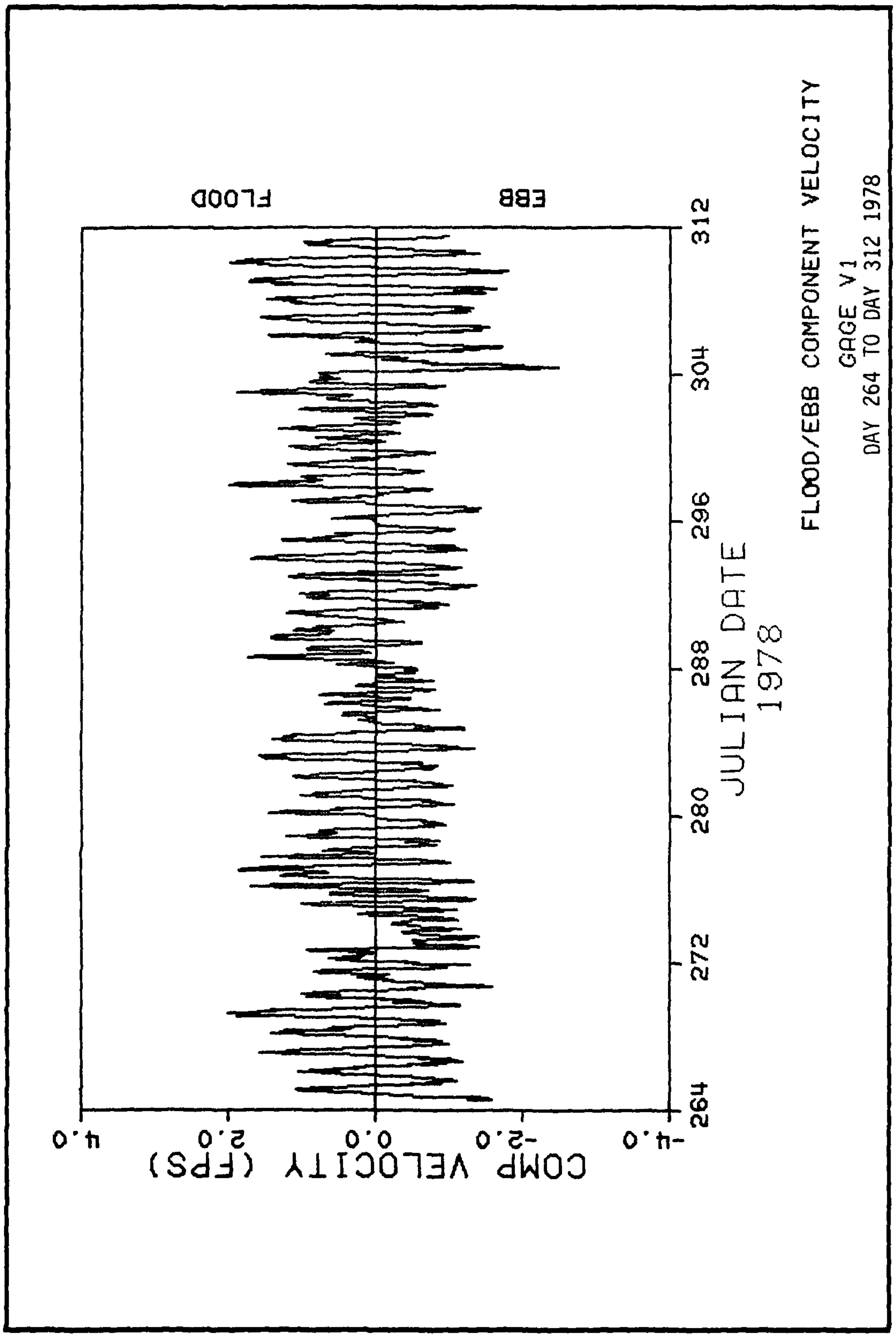
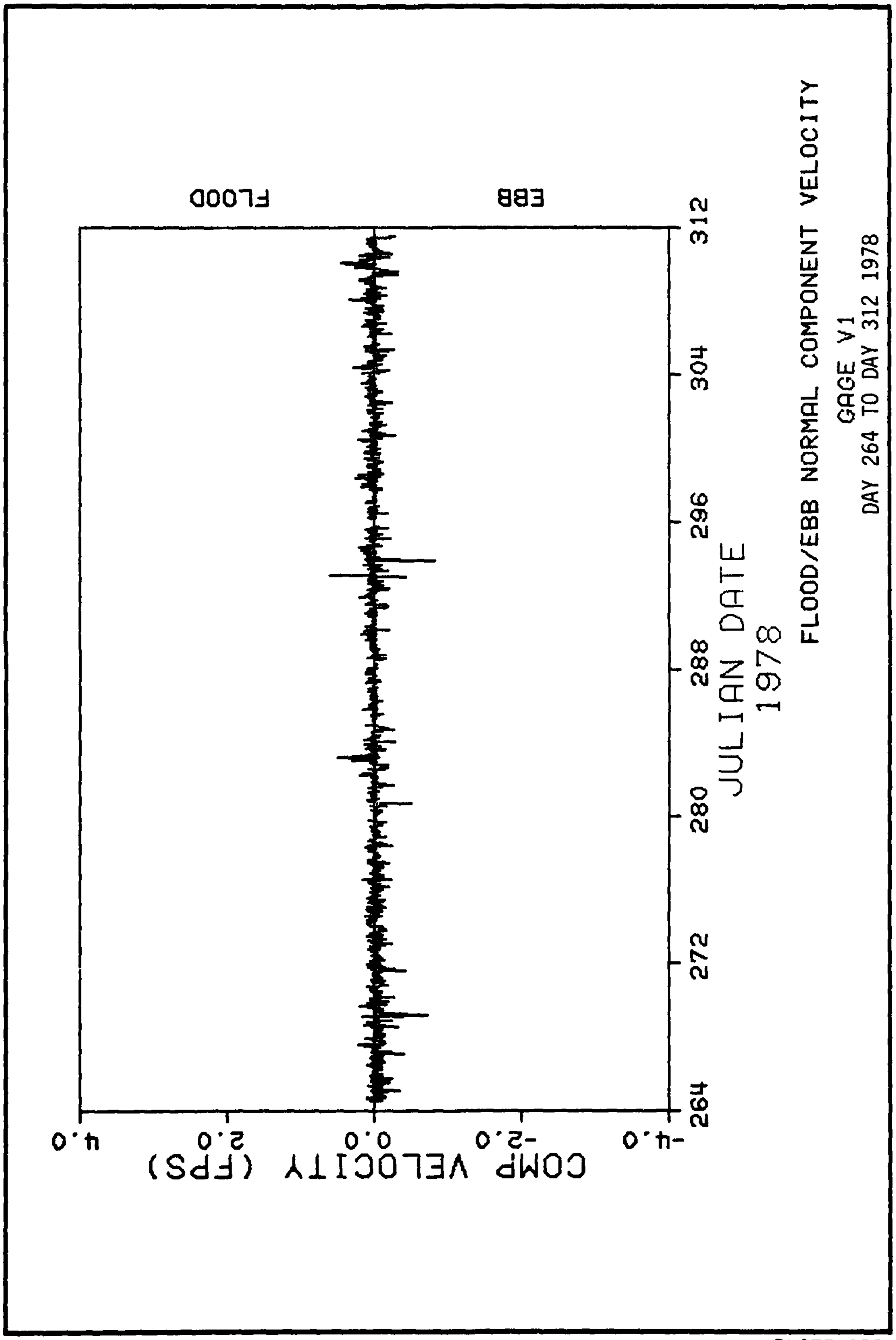

FLOOD/EBB COMPONENT VELOCITY
GAGE V1
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
264
272
280
288
296
304
312
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0

PLATE 128


FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V1
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
COMP VELOCITY (FPS)
FLOOD
EBB
264
272
280
288
296
304
312
4.0
2.0
0.0
-2.0
-4.0

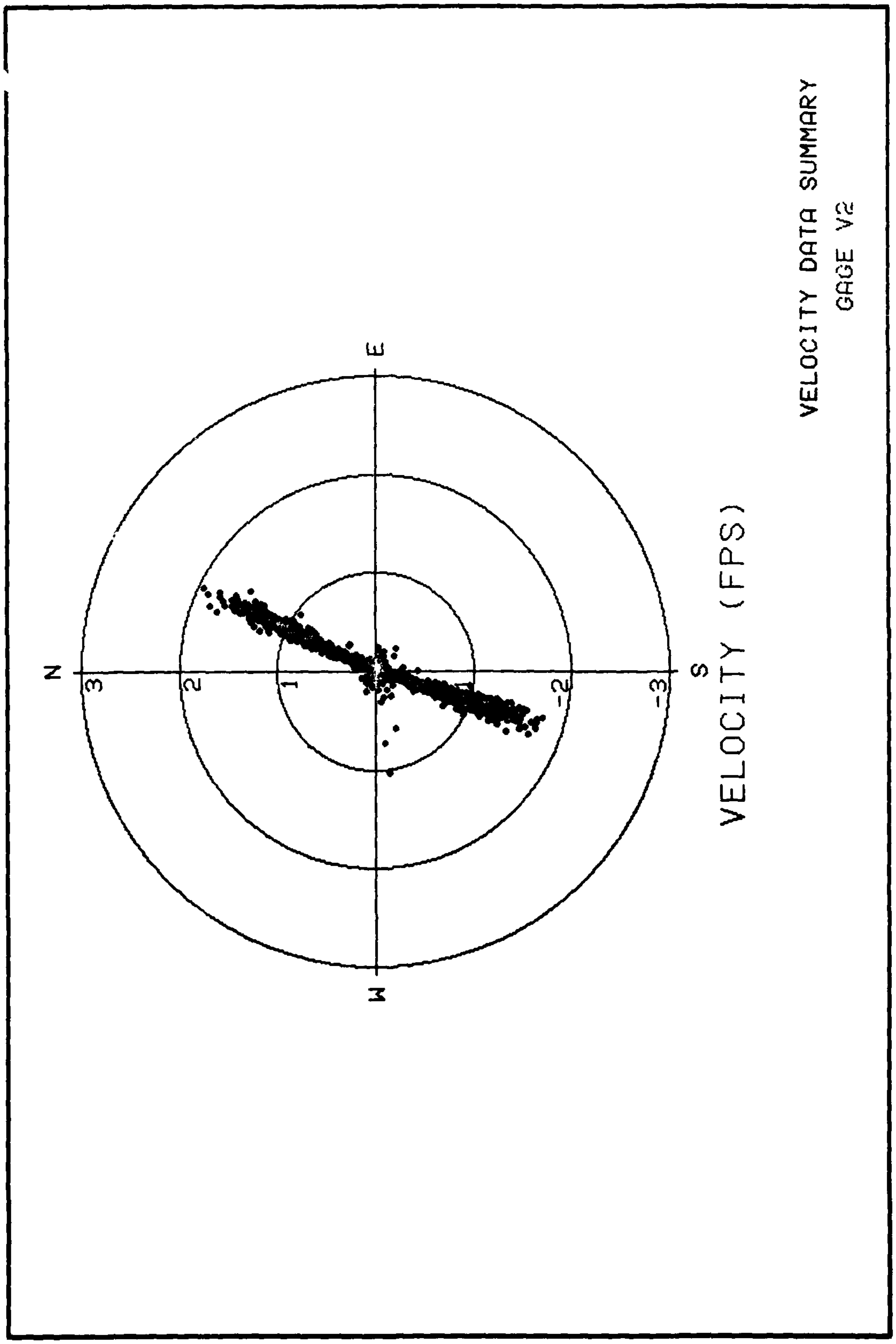
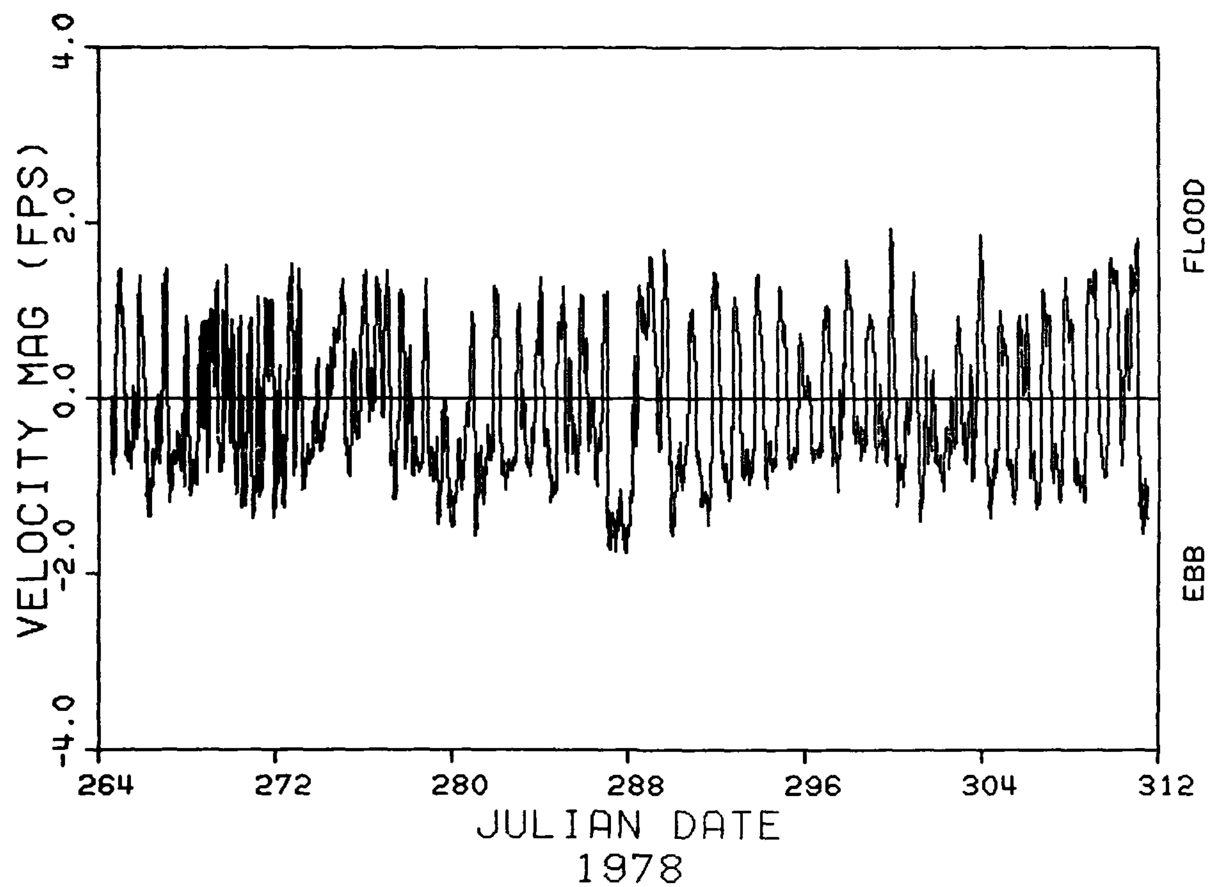


PLATE 130



VELOCITY MAGNITUDE
GAGE V2
DAY 264 TO DAY 312 1978

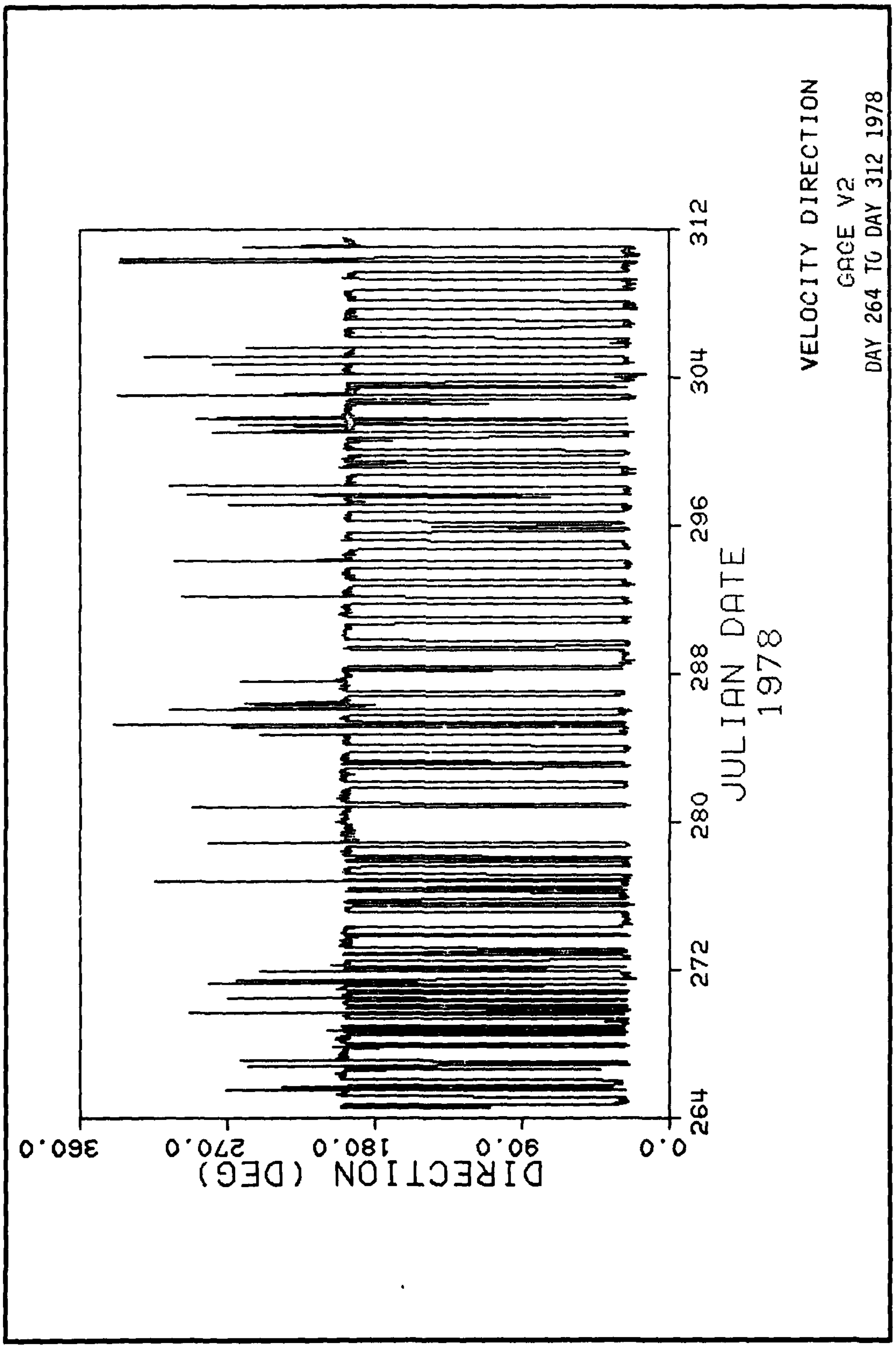
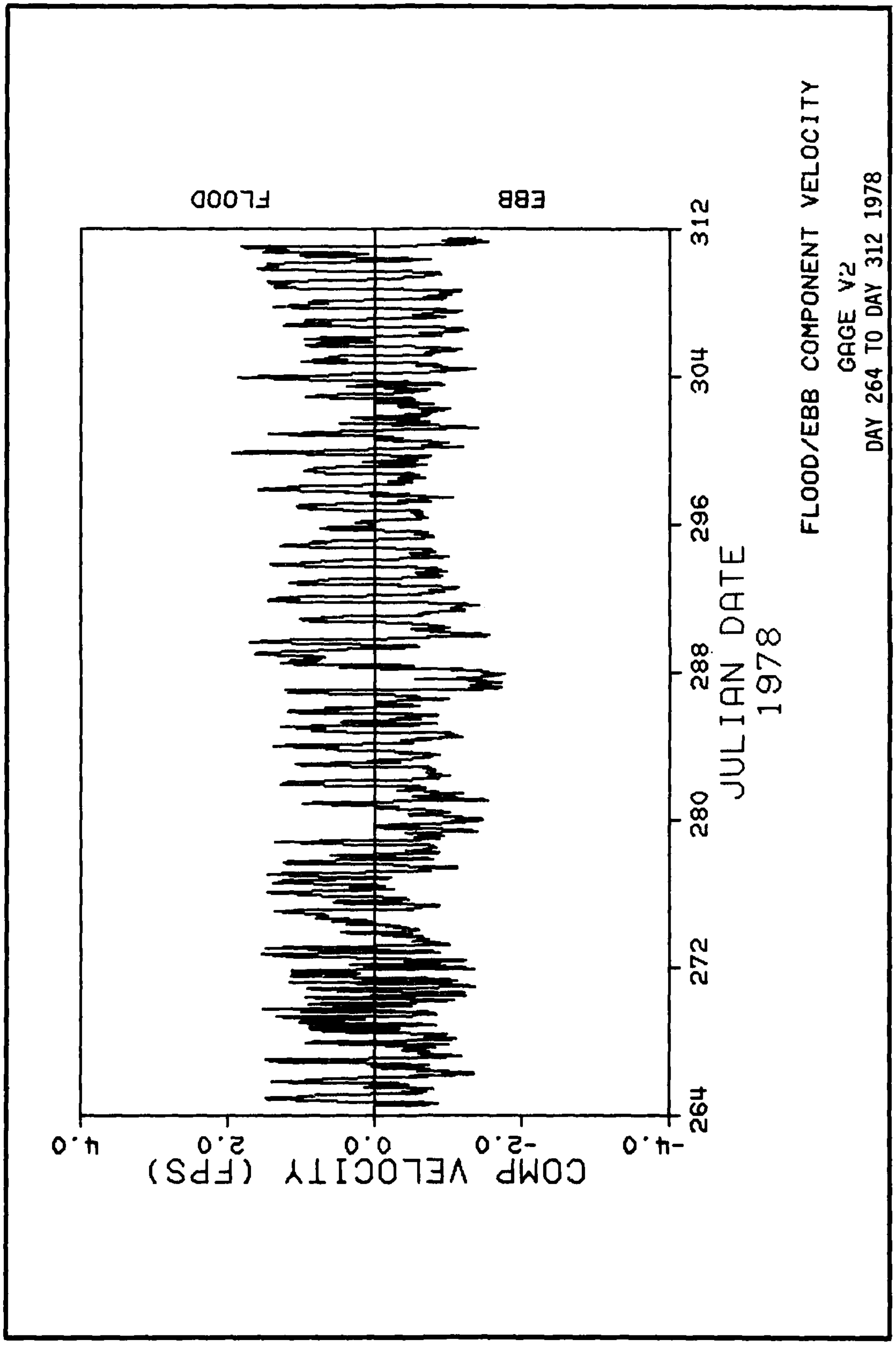
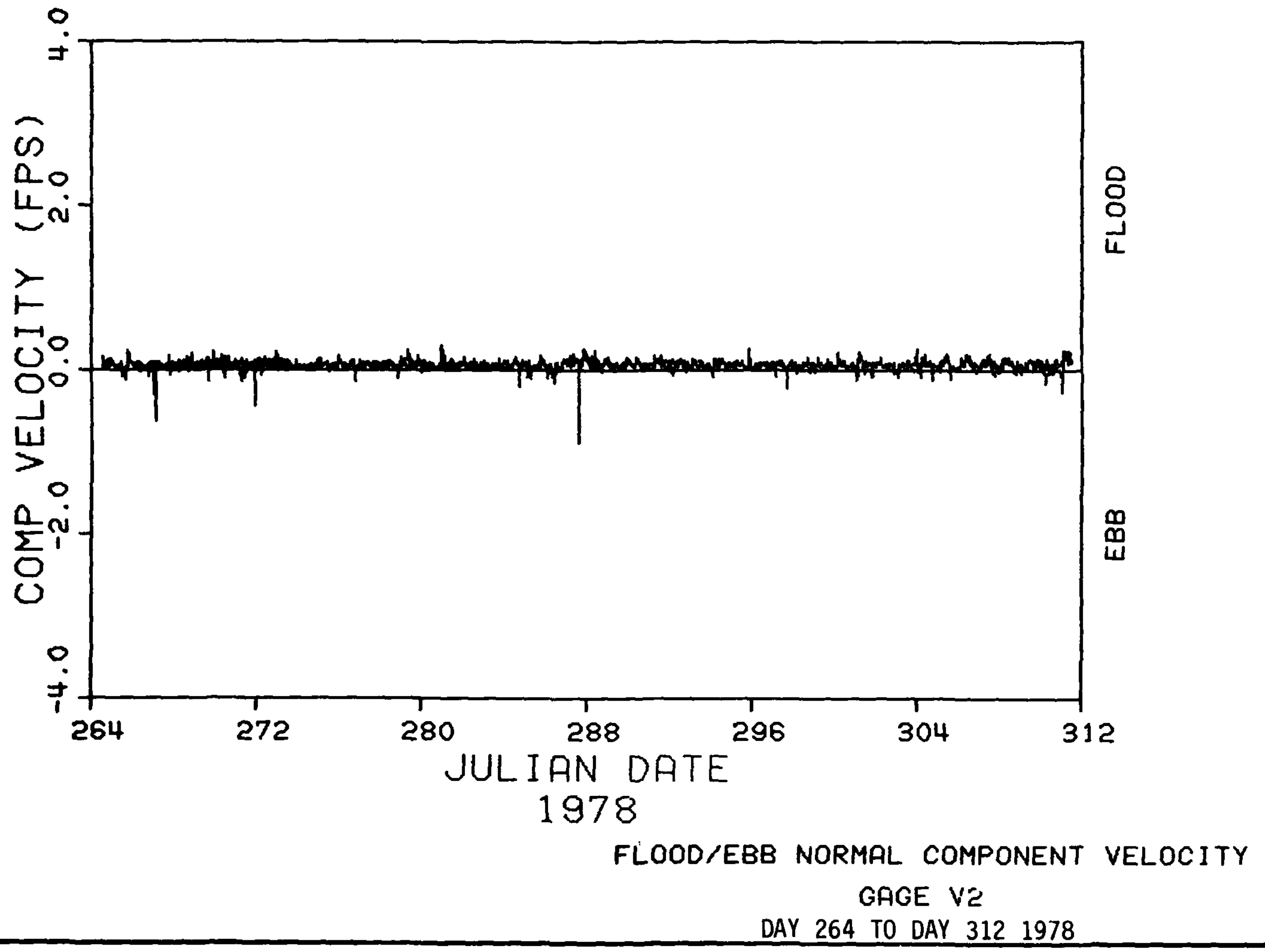

VELOCITY DIRECTION
GAGE V2
DAY 264 TO DAY 312 1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
JULIAN DATE
1978
264
272
280
288
296
304
312

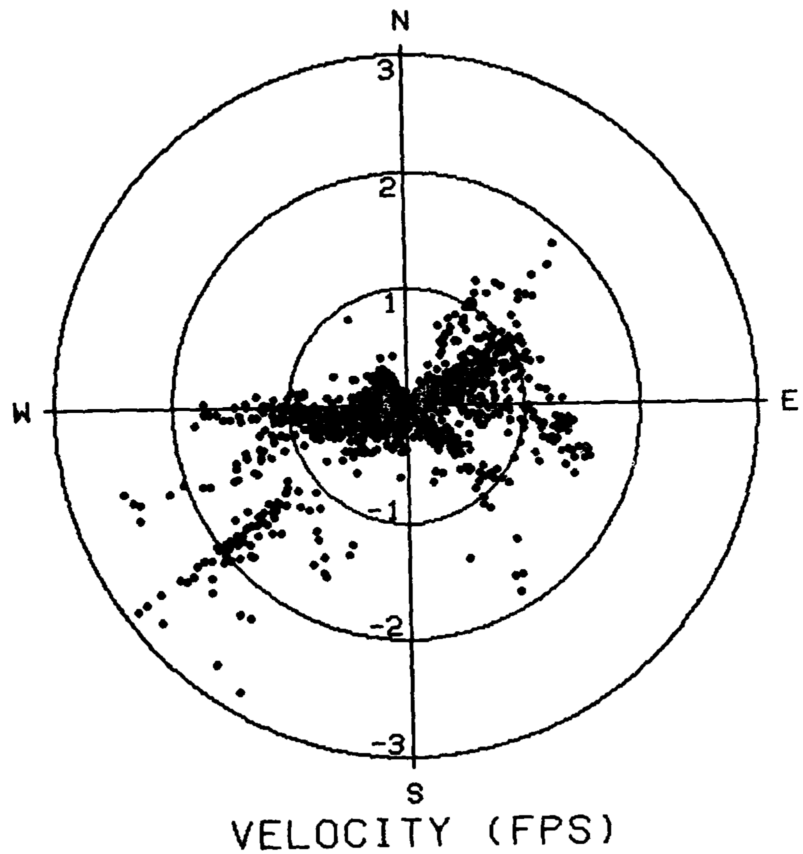
PLATE 132


FLOOD/EBB COMPONENT VELOCITY
GAGE V2
DAY 264 TO DAY 312 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1978
264
272
280
288
296
304
312



COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
FLOOD
EBB
264
272
280
288
296
304
312
JULIAN DATE
1978
FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V2
DAY 264 TO DAY 312 1978

PLATE 134



VELOCITY DATA SUMMARY
GAGE V3

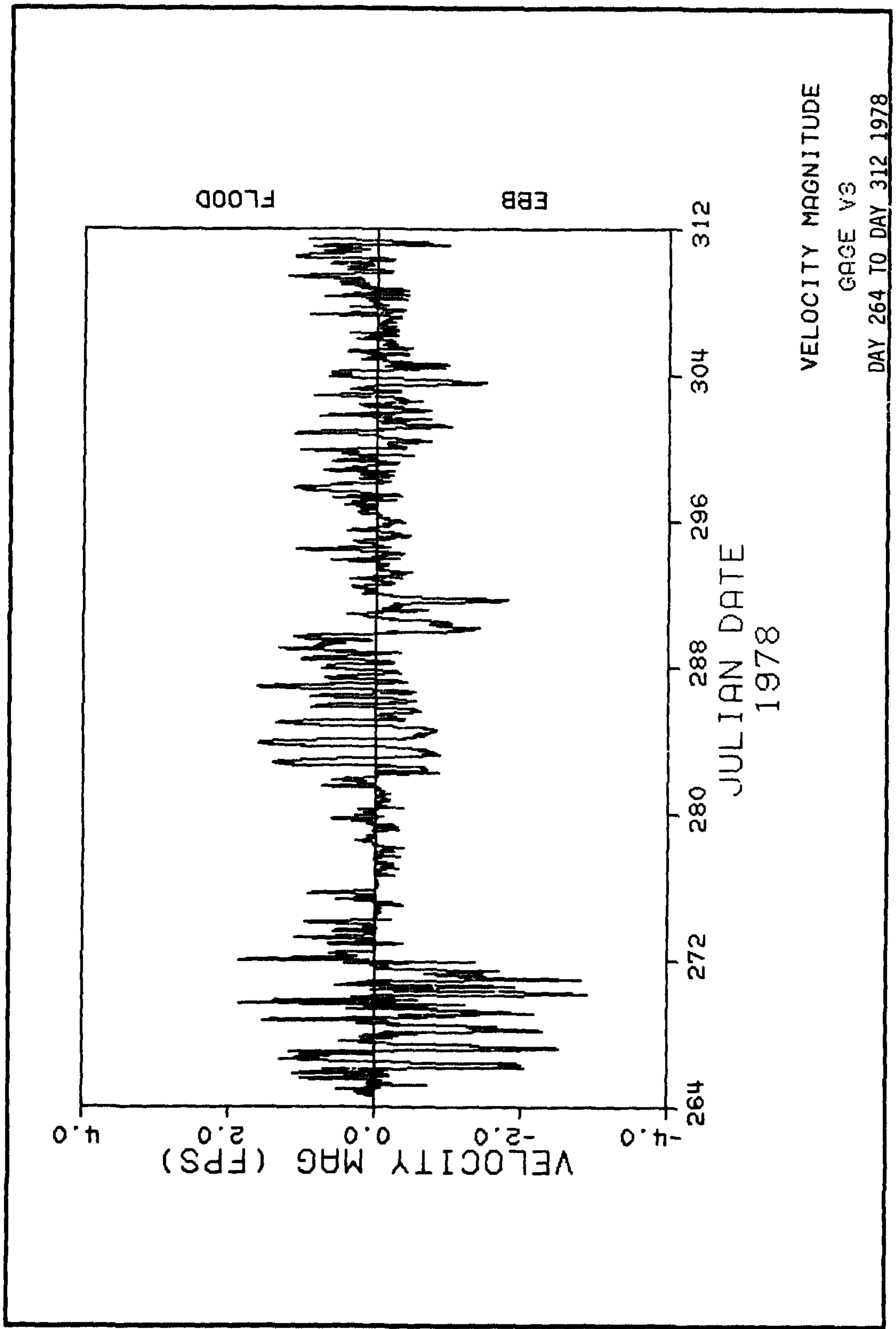
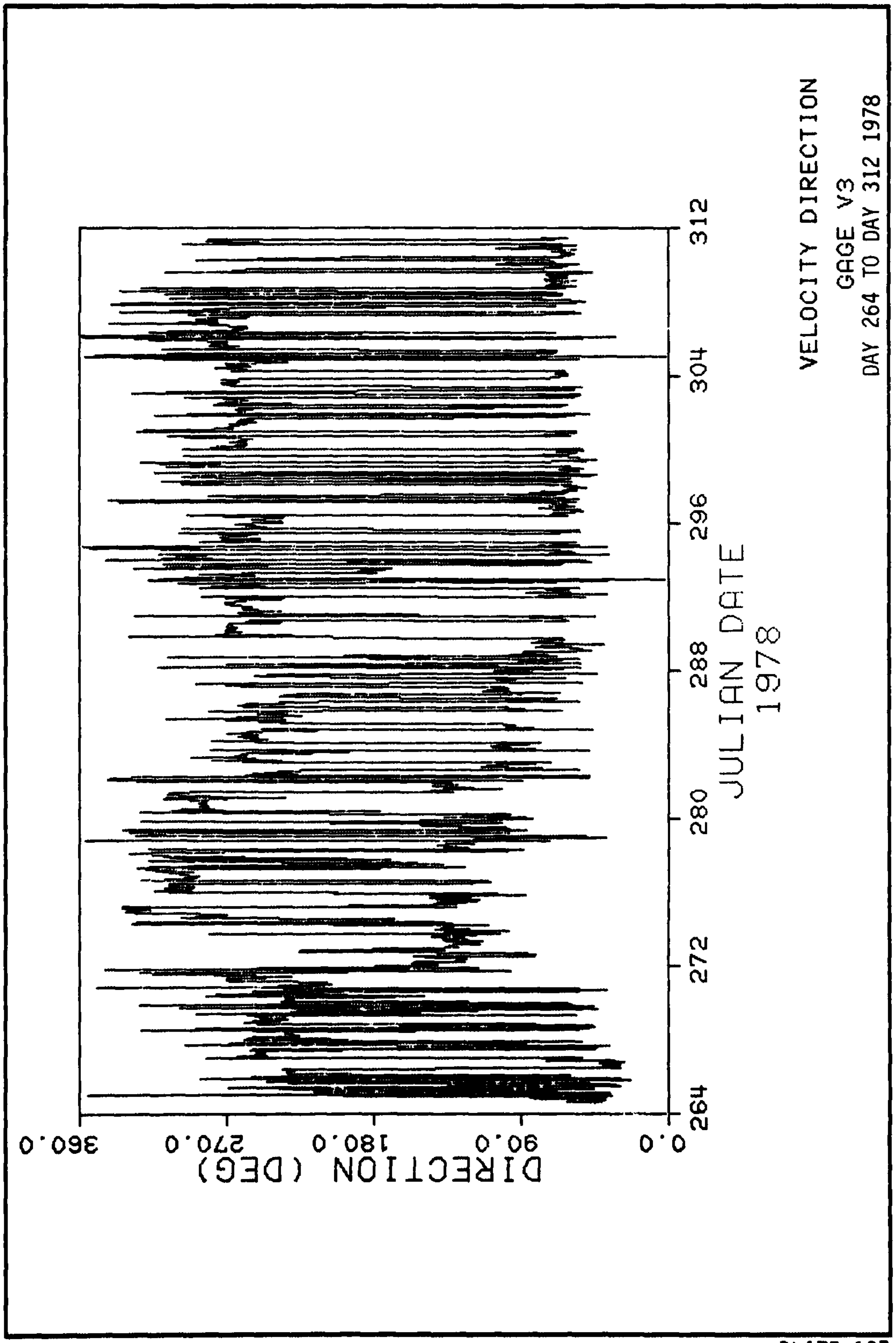

VELOCITY MAGNITUDE
GAGE V3
DAY 264 TO DAY 312 1978
FLOOD
EBB
4.0
2.0
0.0
-2.0
-4.0
VELOCITY MAG (FPS)
264
272
280
288
296
304
312
JULIAN DATE
1978

PLATE 136



VELOCITY DIRECTION
GAGE V3
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
264
272
280
288
296
304
312

PLATE 137

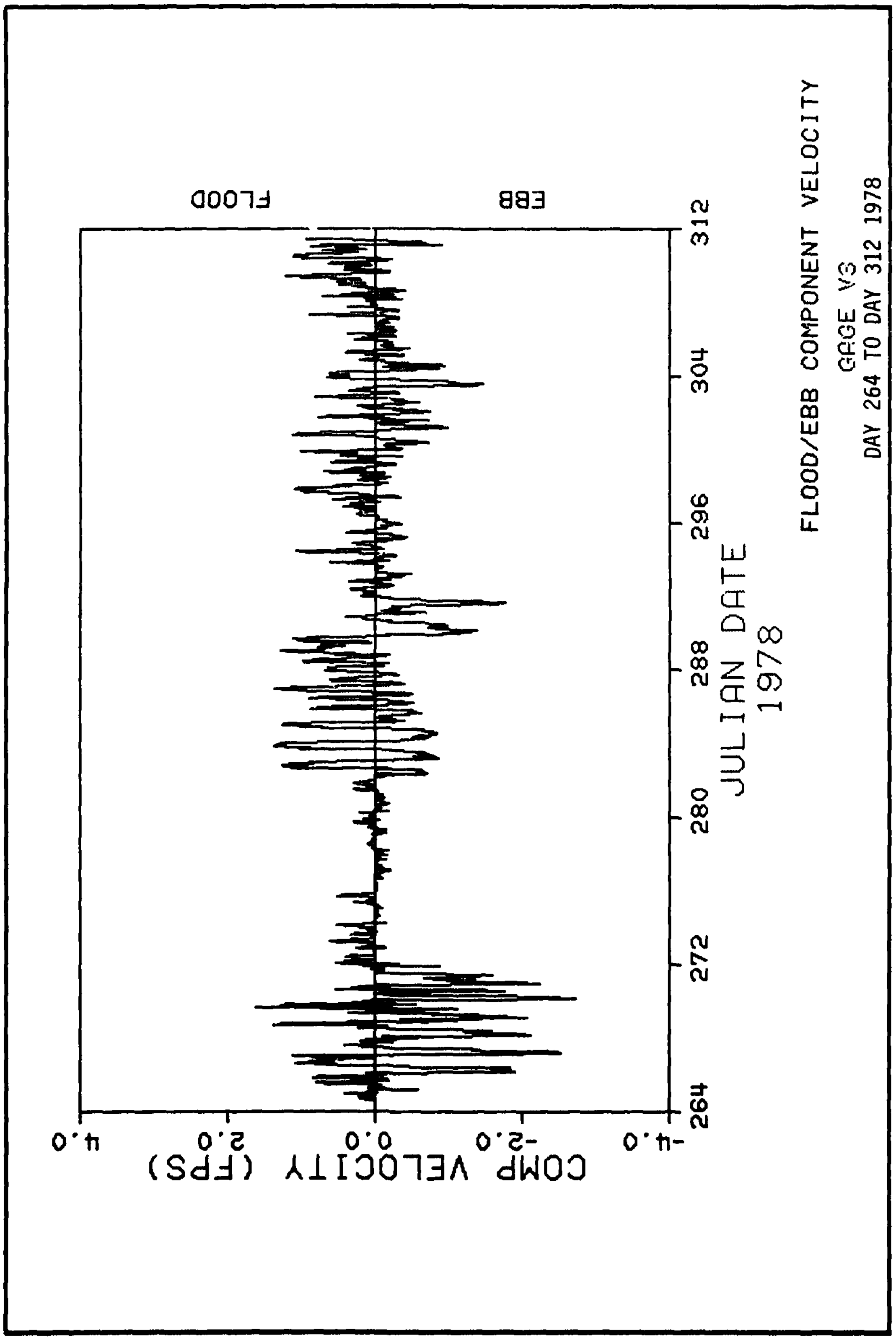
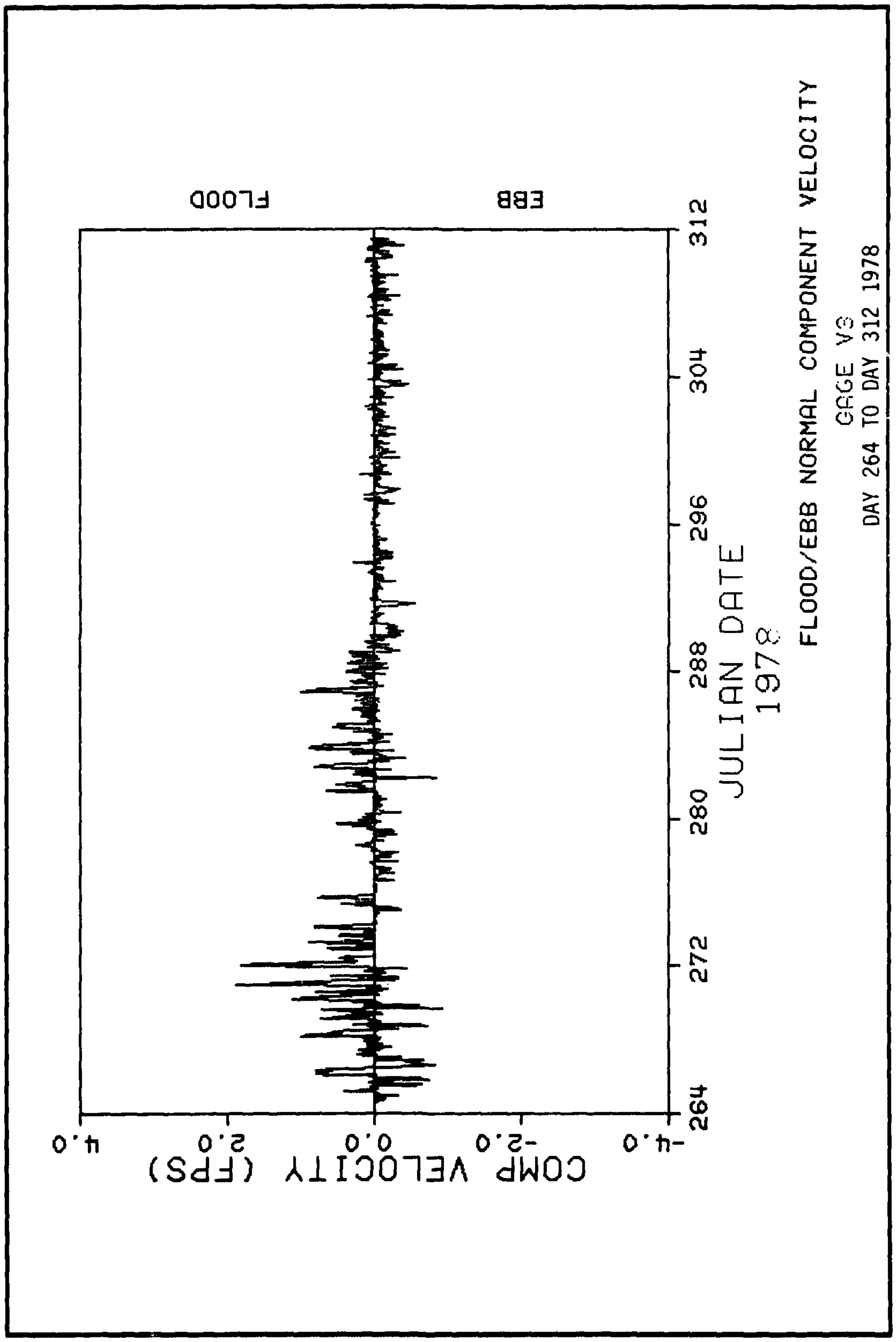
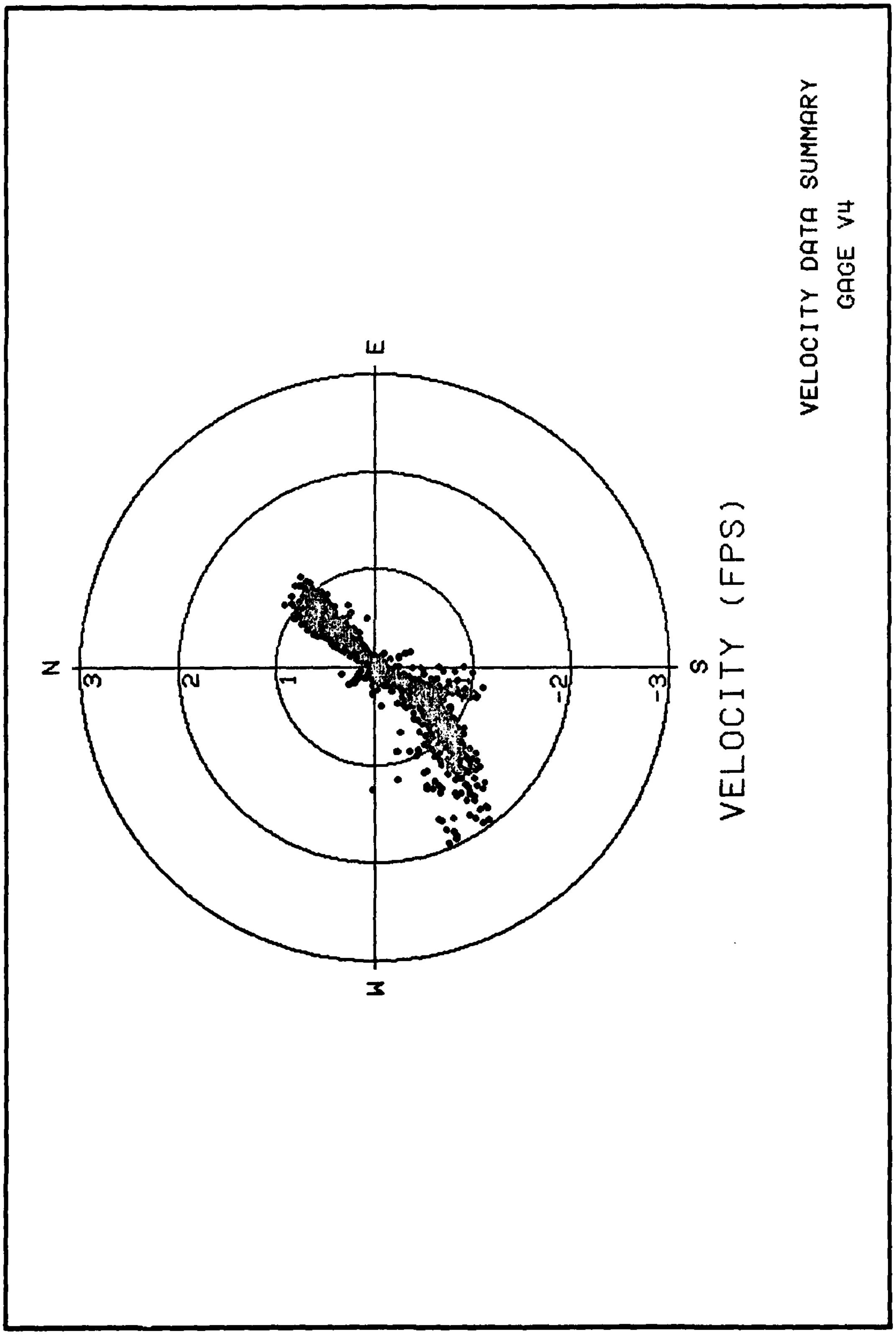

FLOOD/EBB COMPONENT VELOCITY
GAGE V3
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
264
272
280
288
296
304
312
COMP VELOCITY (FPS)
-4.0
-2.0
0.0
2.0
4.0

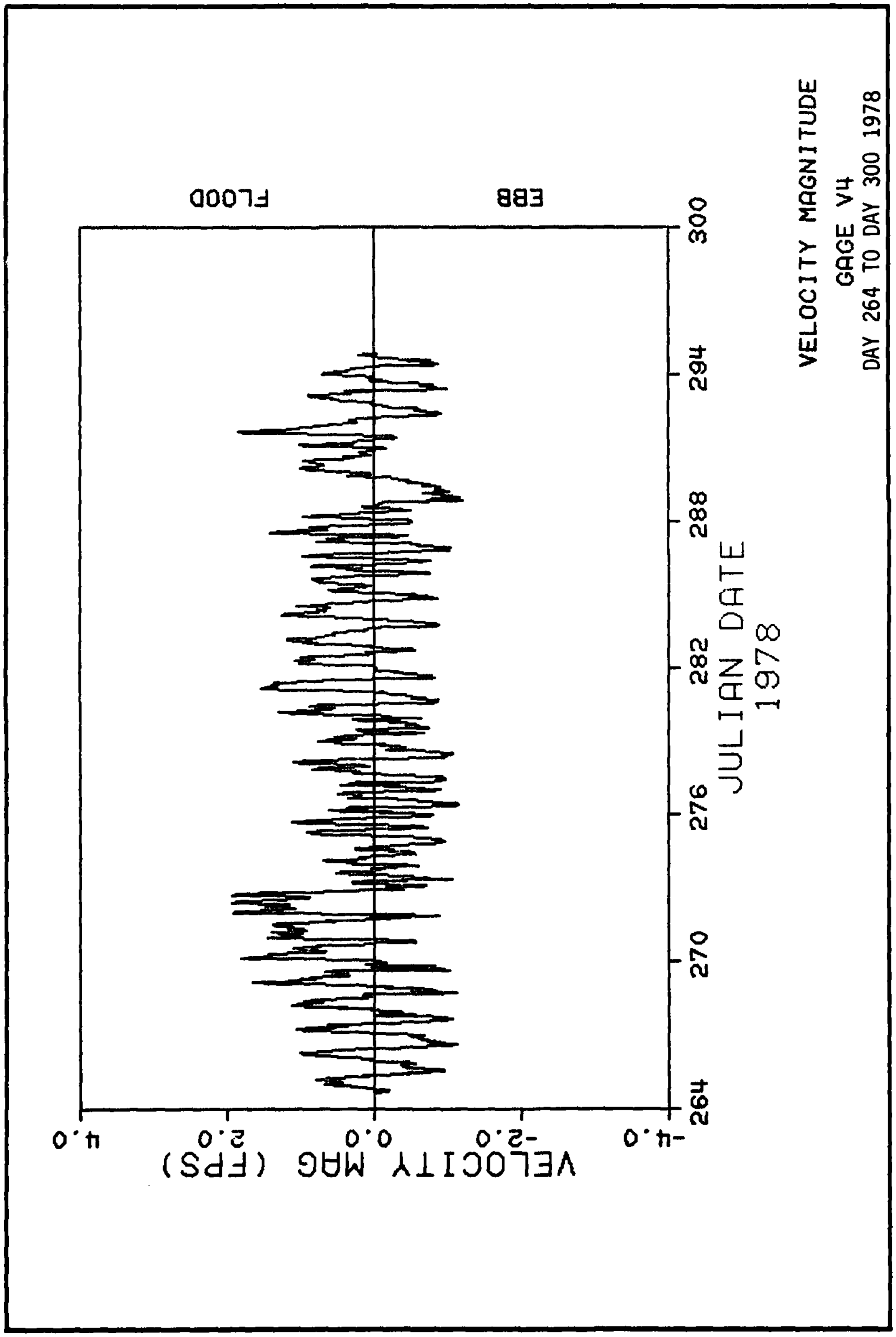
PLATE 138



FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V3
DAY 264 TO DAY 312 1978

PLATE 139


VELOCITY DATA SUMMARY
GAGE V4
VELOCITY (FPS)
N
S
E
W
3
2
1
-1
-2
-3


VELOCITY MAGNITUDE
GAGE V4
DAY 264 TO DAY 300 1978
FLOOD
EBB
JULIAN DATE
1978
264
270
276
282
288
294
300
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0

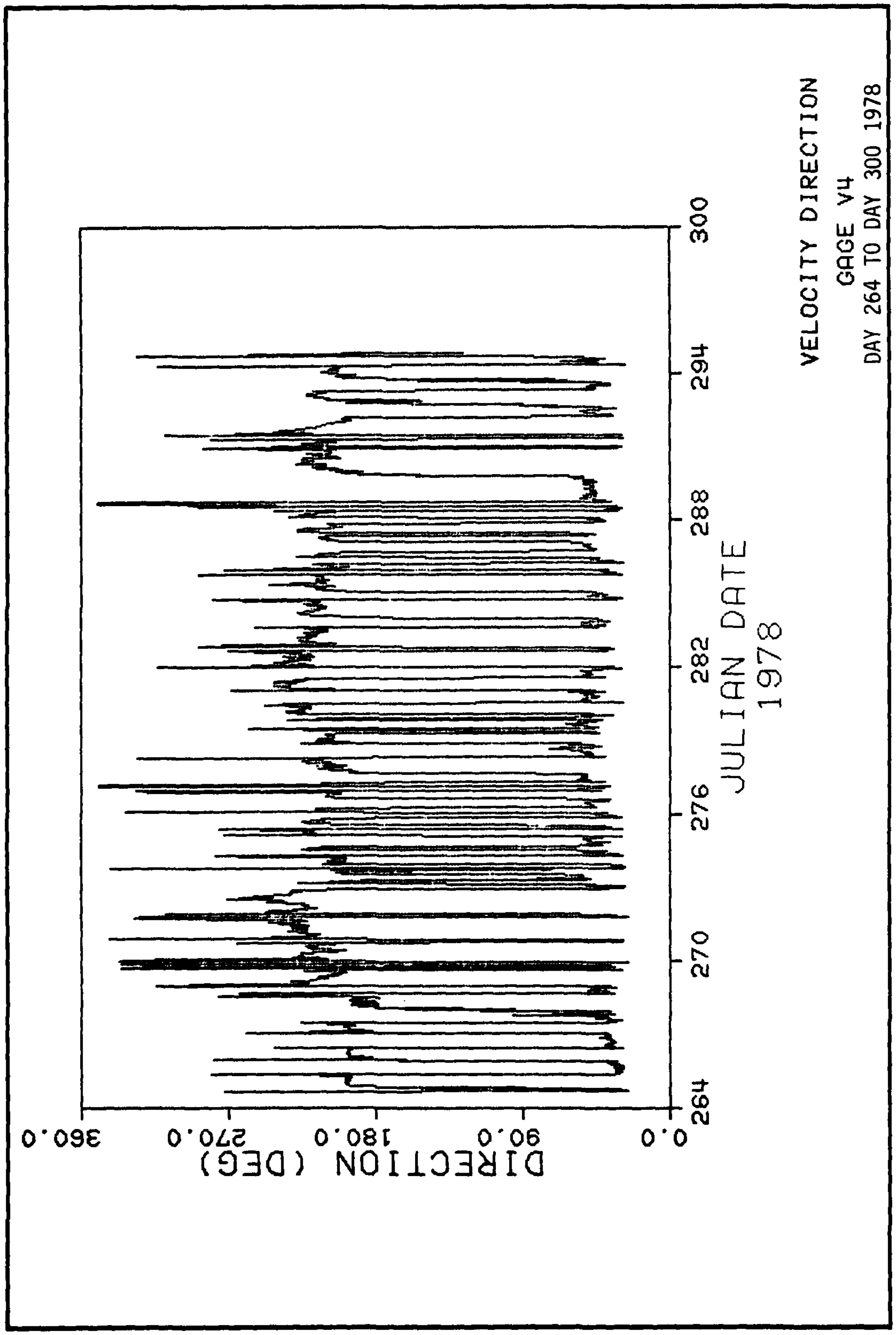
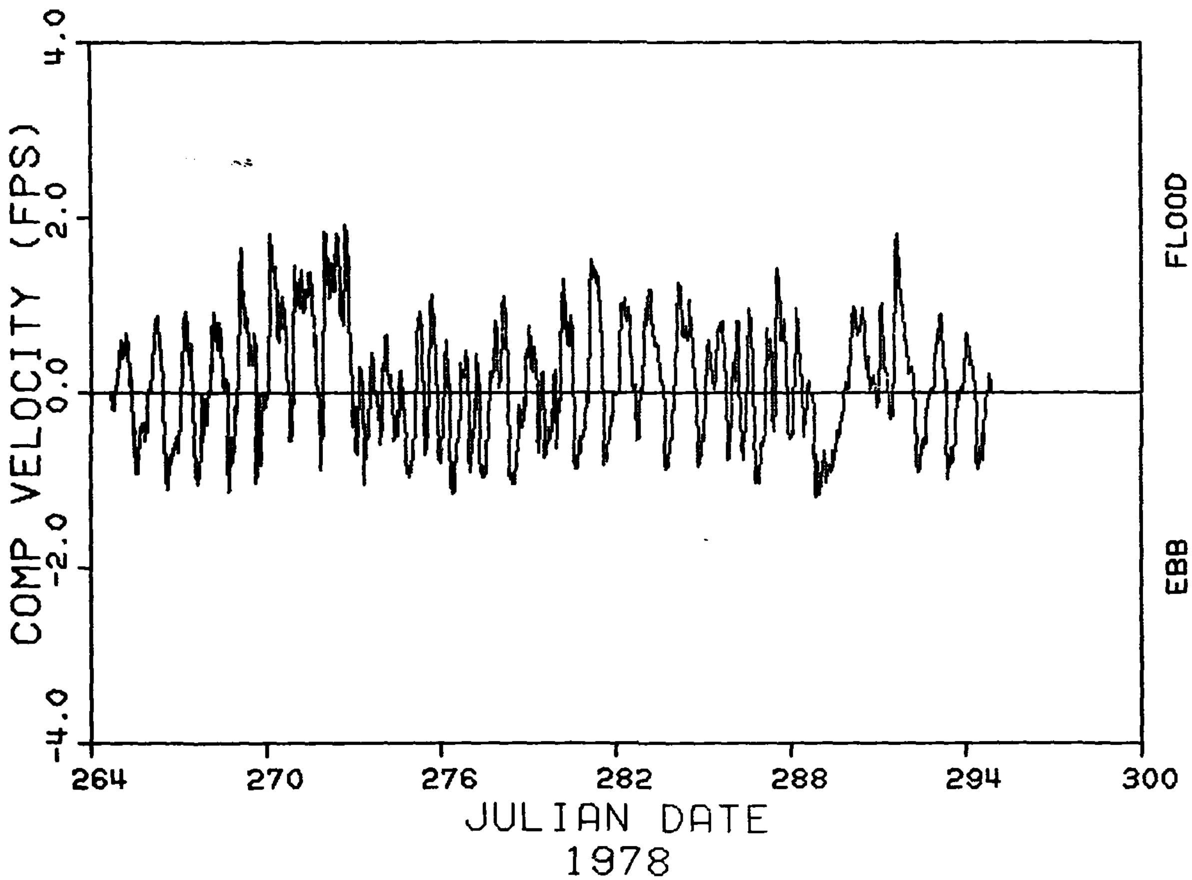

VELOCITY DIRECTION
GAGE V4
DAY 264 TO DAY 300 1978
JULIAN DATE
1978
264
270
276
282
288
294
300
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0

PLATE 142



FLOOD/EBB COMPONENT VELOCITY
GAGE V4
DAY 264 TO DAY 300 1978

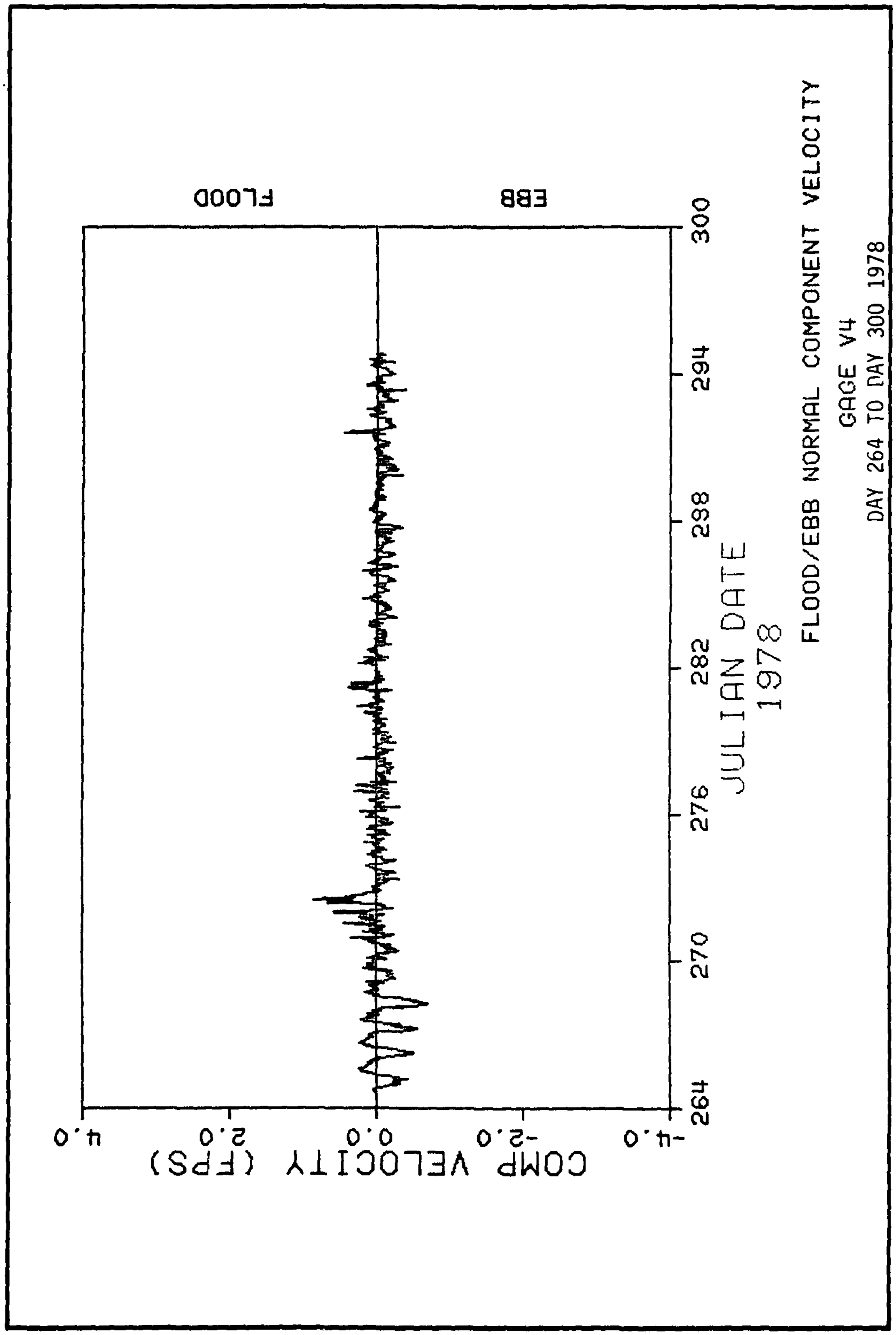
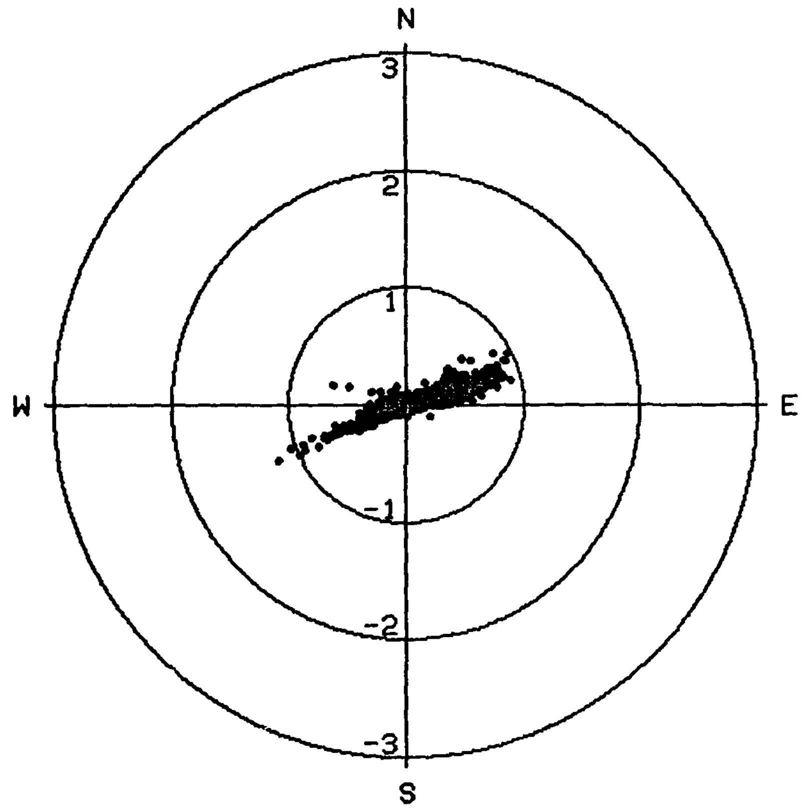

FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V4
DAY 264 TO DAY 300 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1978
264
270
276
282
288
294
300

PLATE 144



VELOCITY DATA SUMMARY
GAGE V5

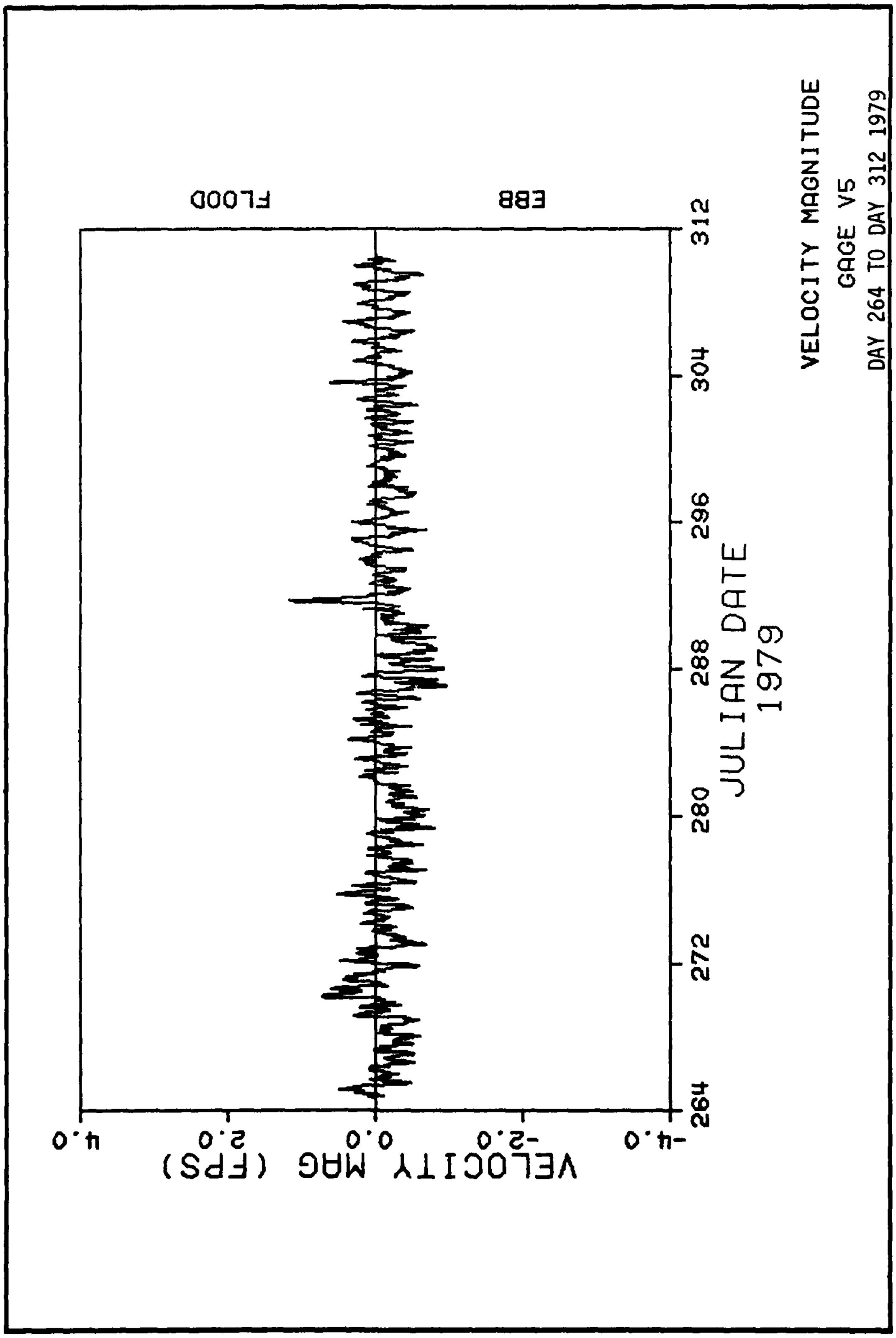
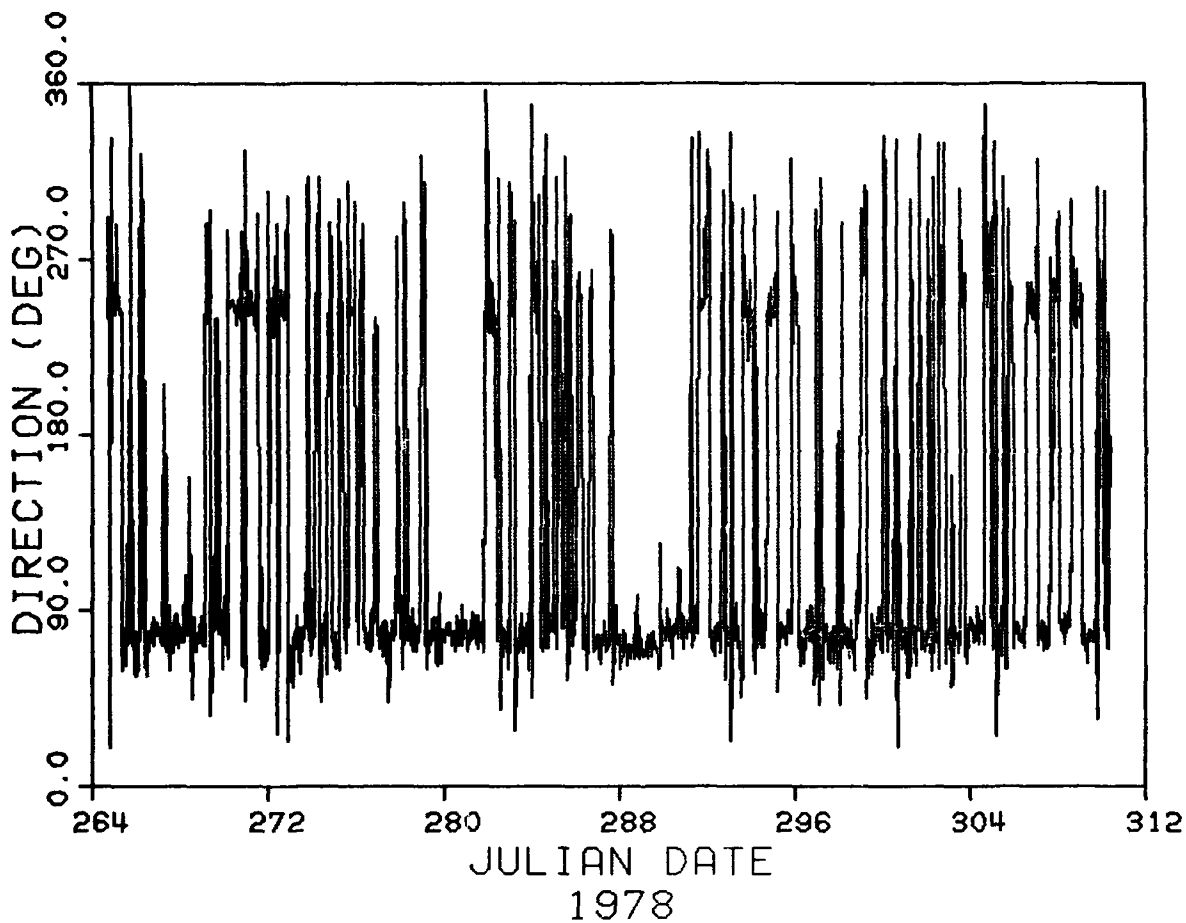

VELOCITY MAGNITUDE
GAGE V5
DAY 264 TO DAY 312 1979
FLOOD
EBB
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312
JULIAN DATE
1979

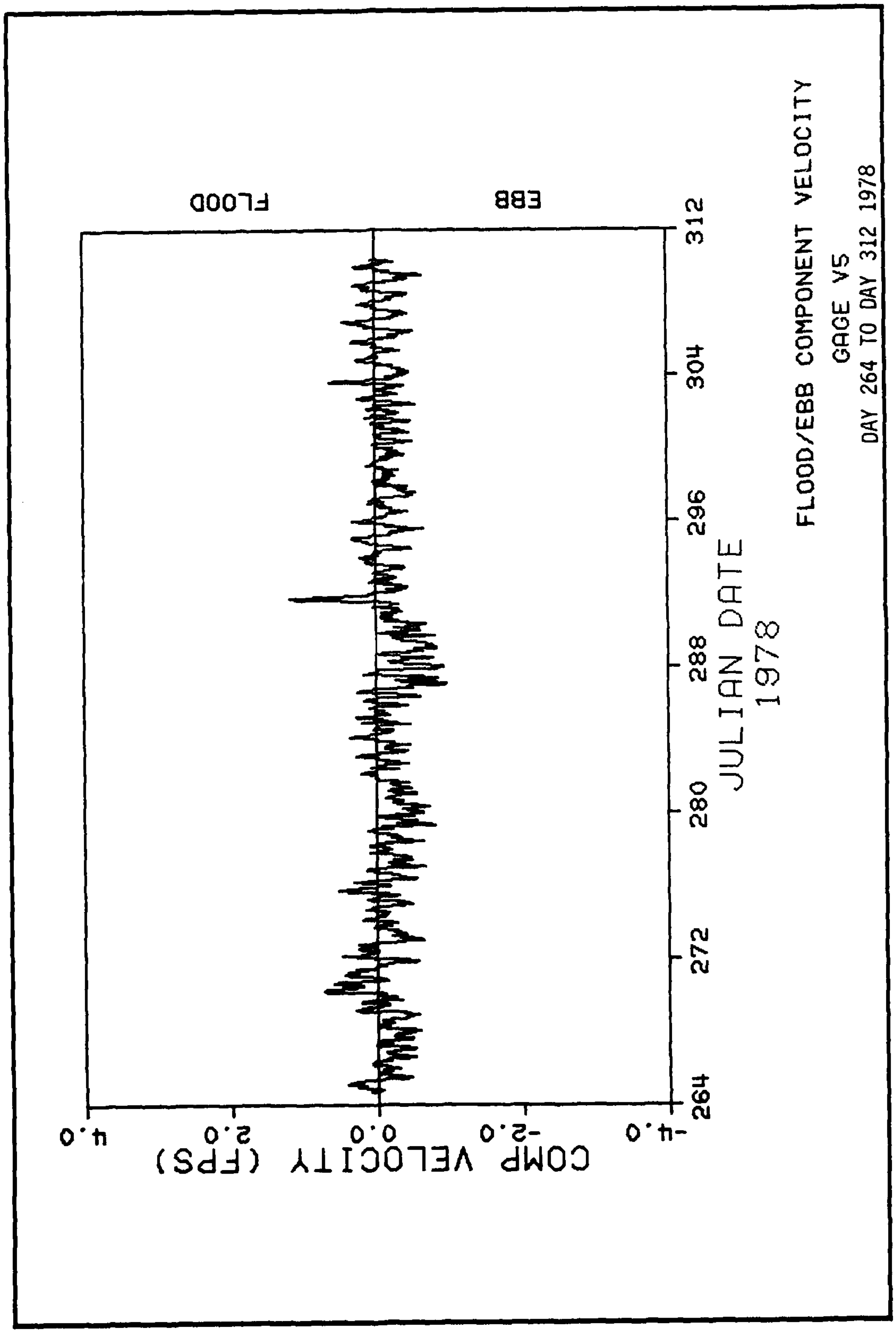
PLATE 146



VELOCITY DIRECTION

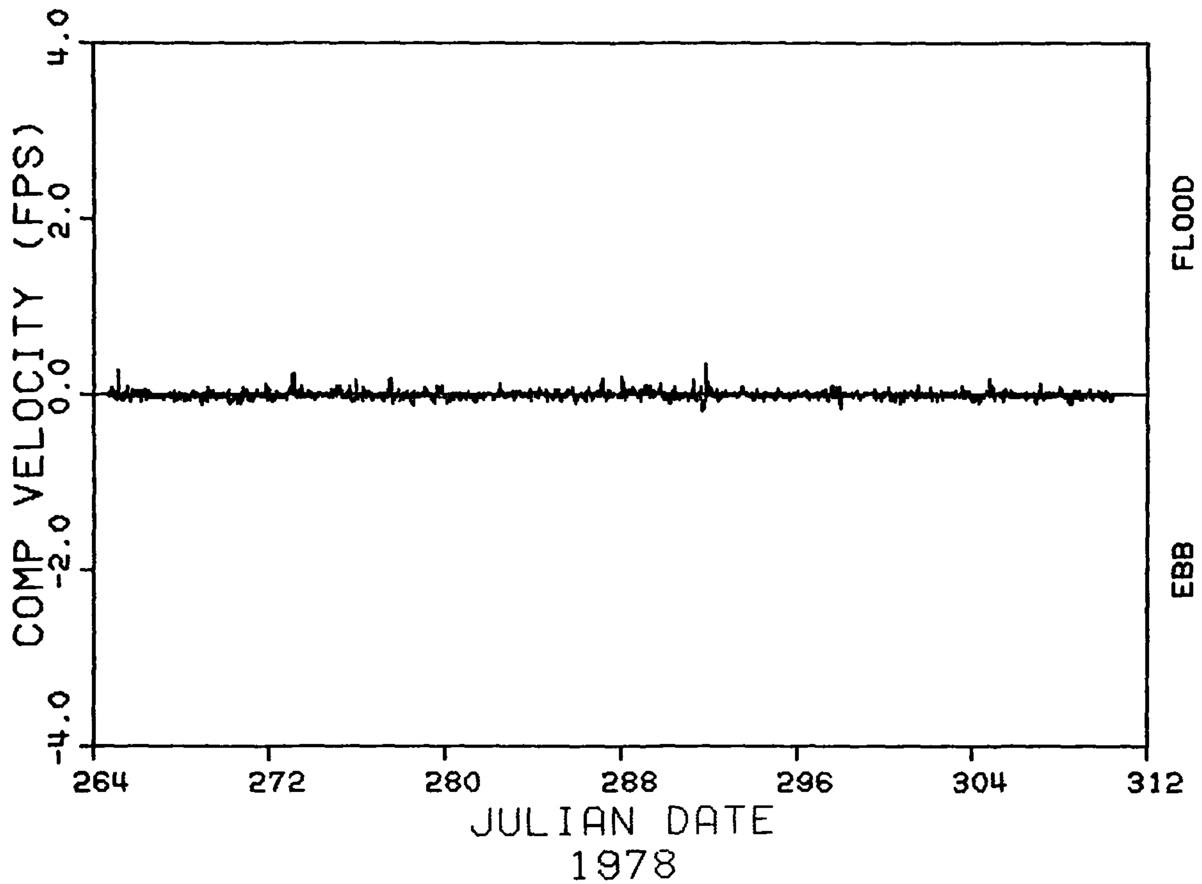
GAGE V5

DAY 264 TO DAY 312 1978

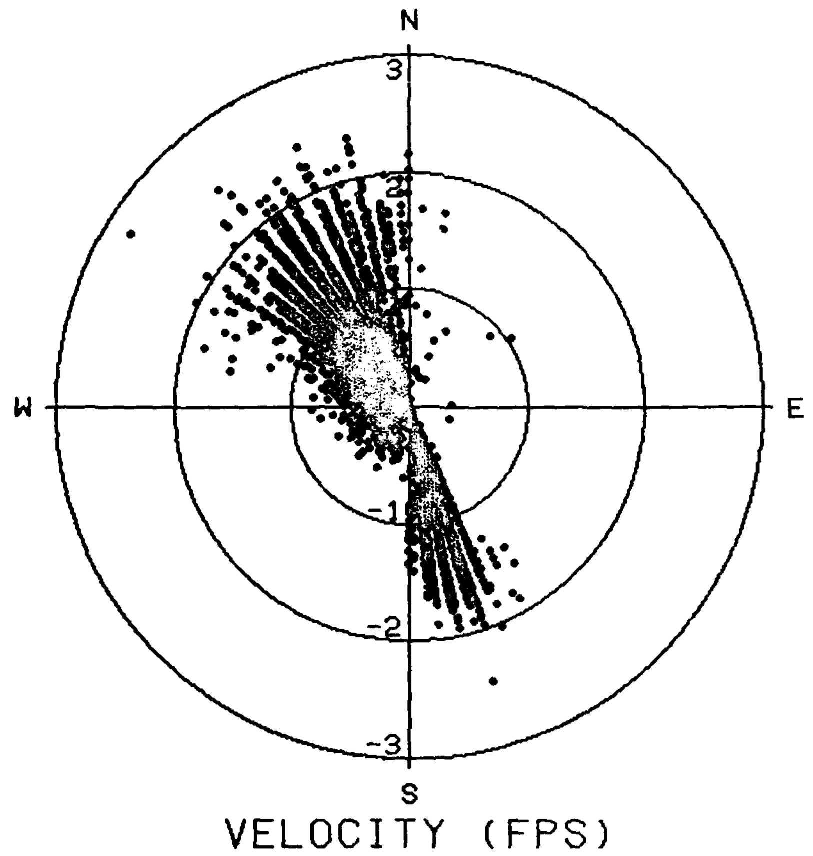


FLOOD/EBB COMPONENT VELOCITY
GAGE V5
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312

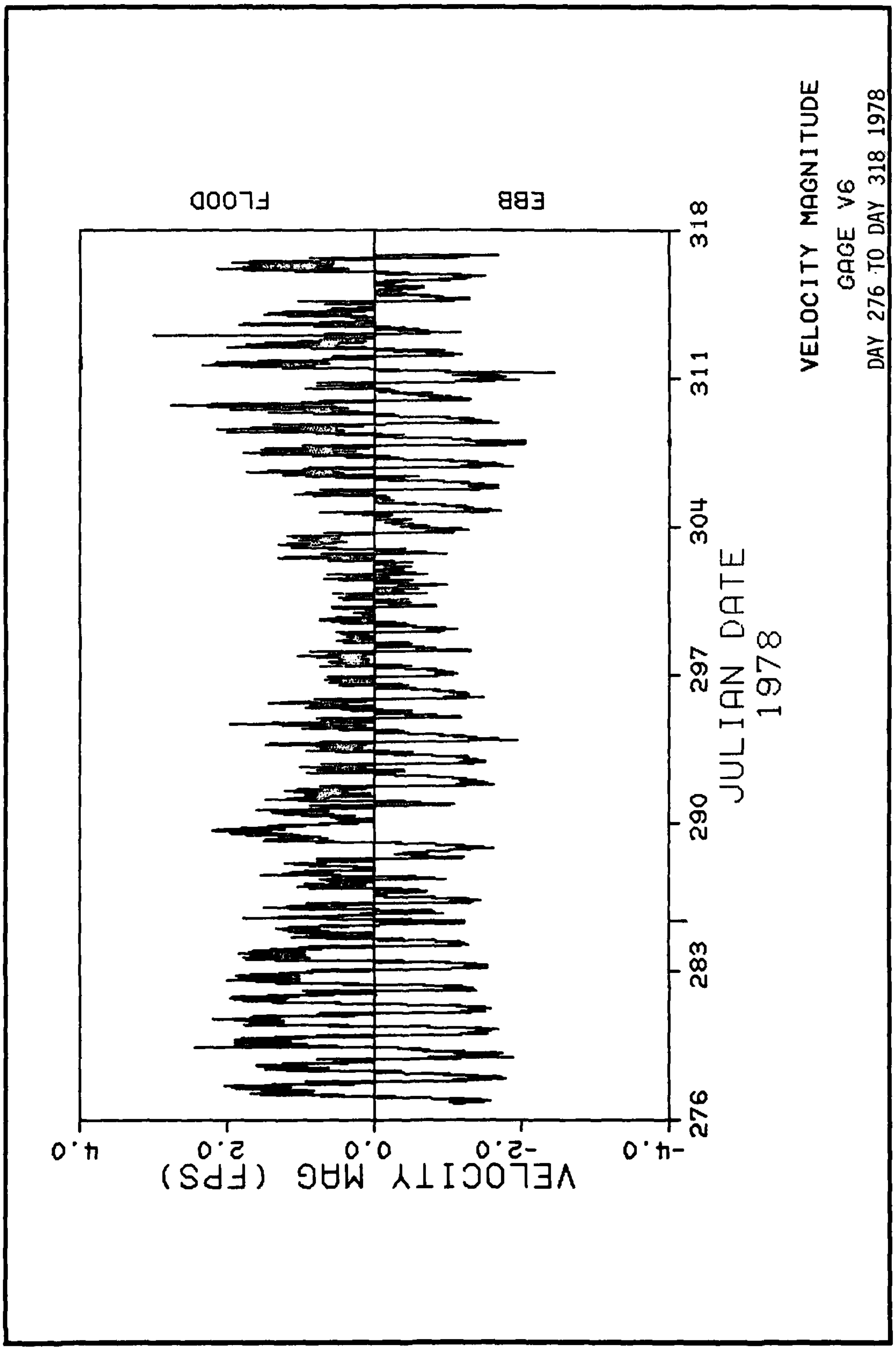
PLATE 148



FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V5
DAY 264 TO DAY 312 1978



VELOCITY DATA SUMMARY
GAGE V6


VELOCITY MAGNITUDE
GAGE V6
DAY 276 TO DAY 318 1978
FLOOD
EBB
JULIAN DATE
1978
276
283
290
297
304
311
318
VELOCITY MAG (FPS)
-4.0
-2.0
0.0
2.0
4.0

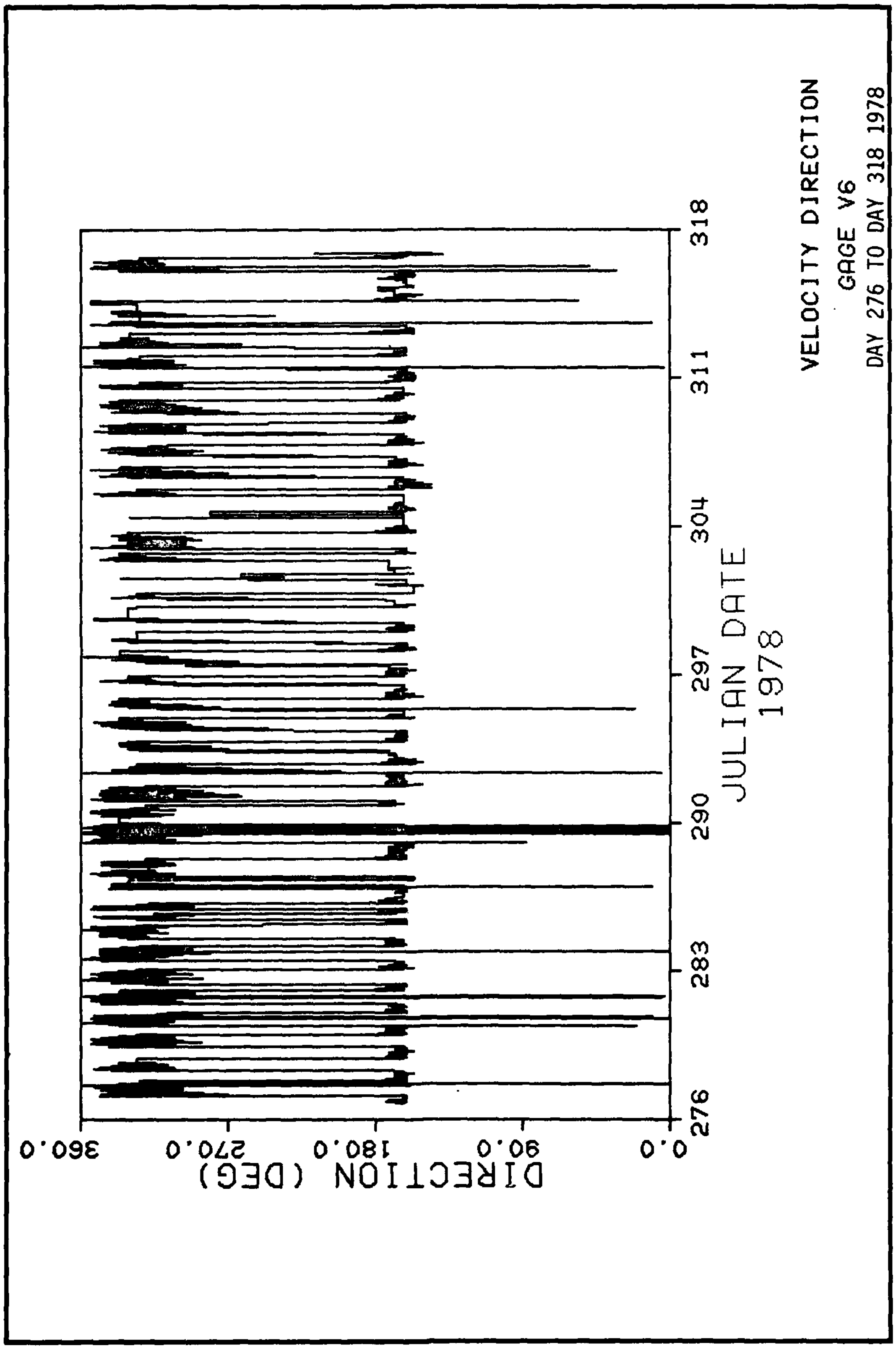
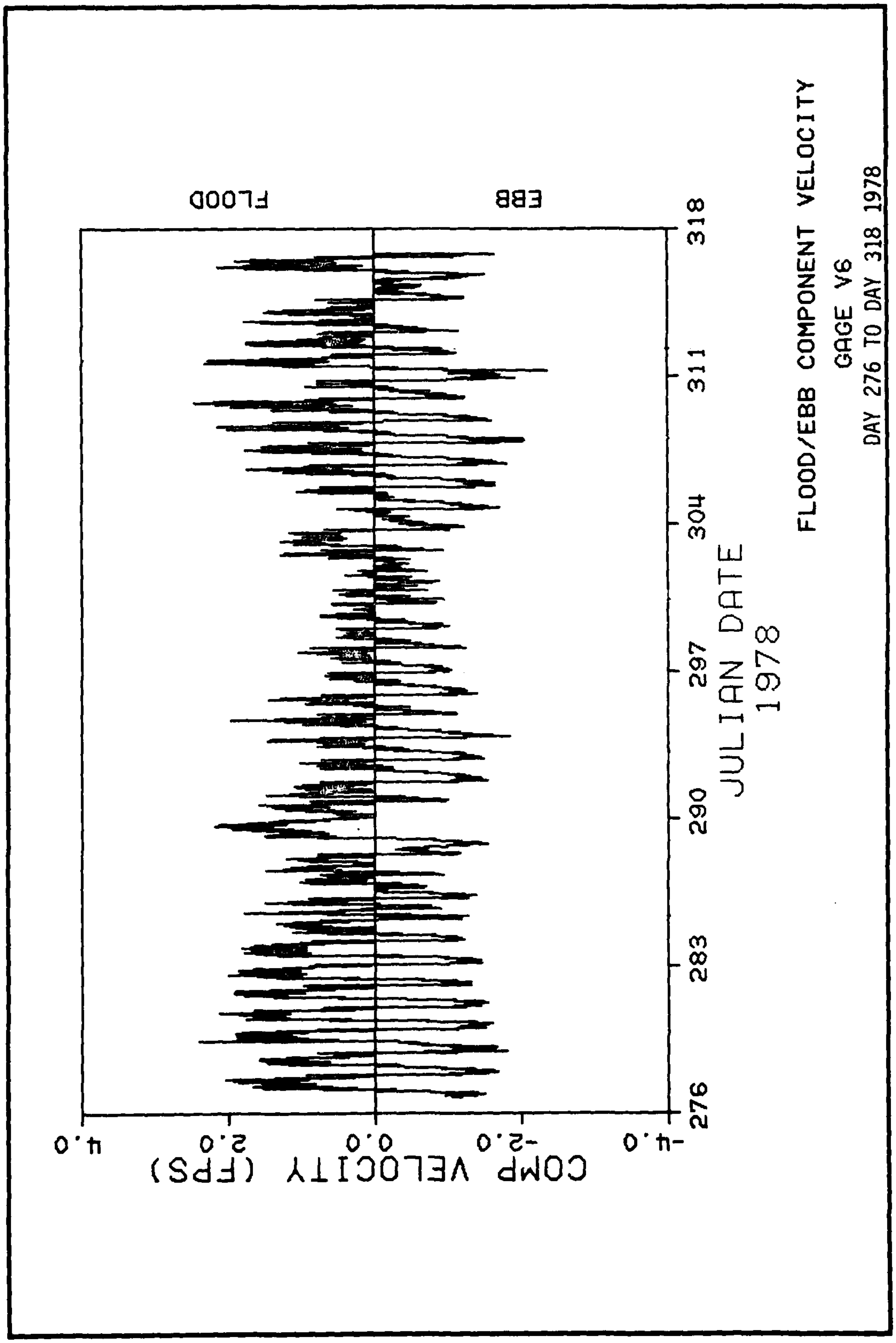

VELOCITY DIRECTION
GAGE V6
DAY 276 TO DAY 318 1978
JULIAN DATE
1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
276
283
290
297
304
311
318

PLATE 152


FLOOD/EBB COMPONENT VELOCITY
GAGE V6
DAY 276 TO DAY 318 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
276
283
290
297
304
311
318
JULIAN DATE
1978

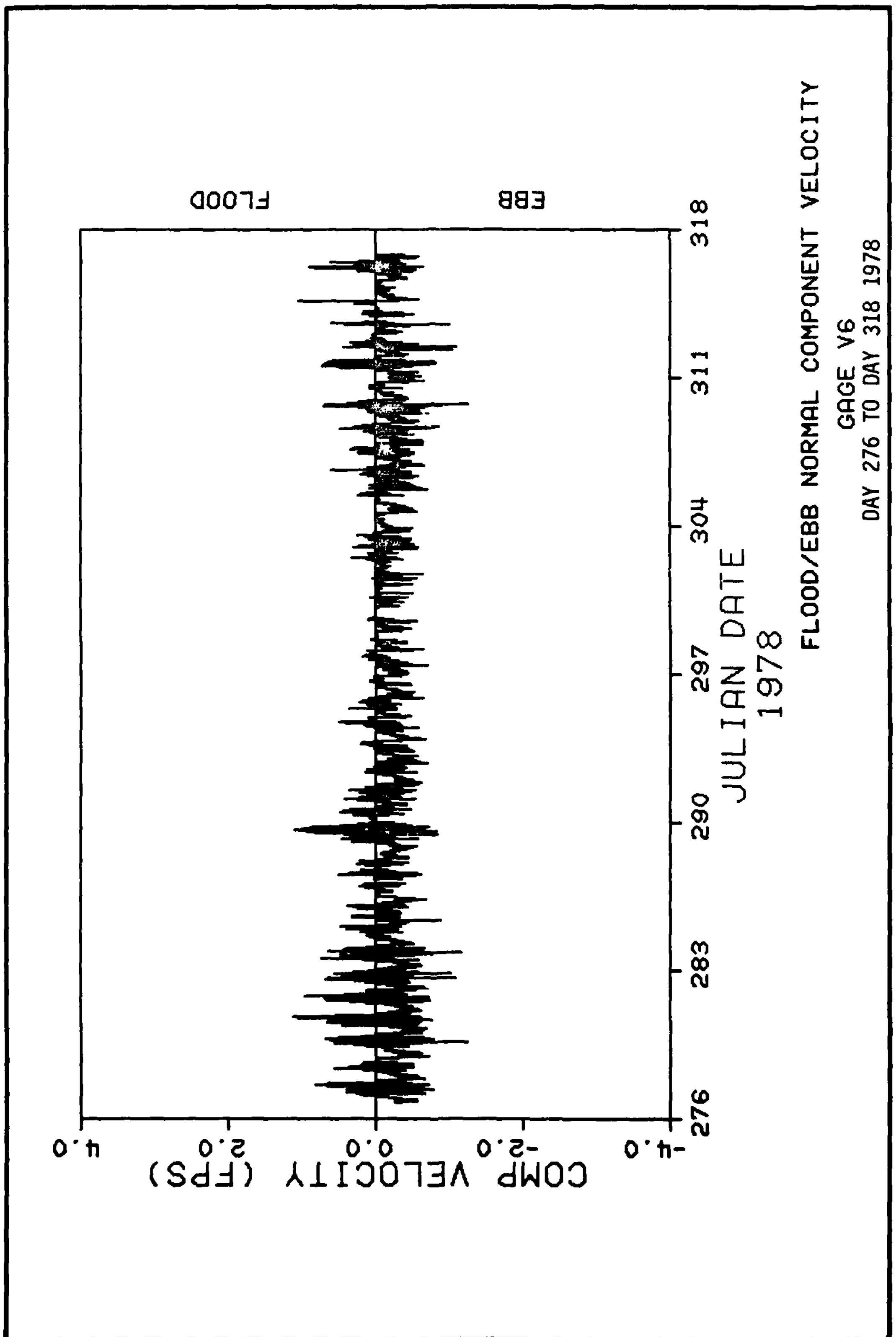
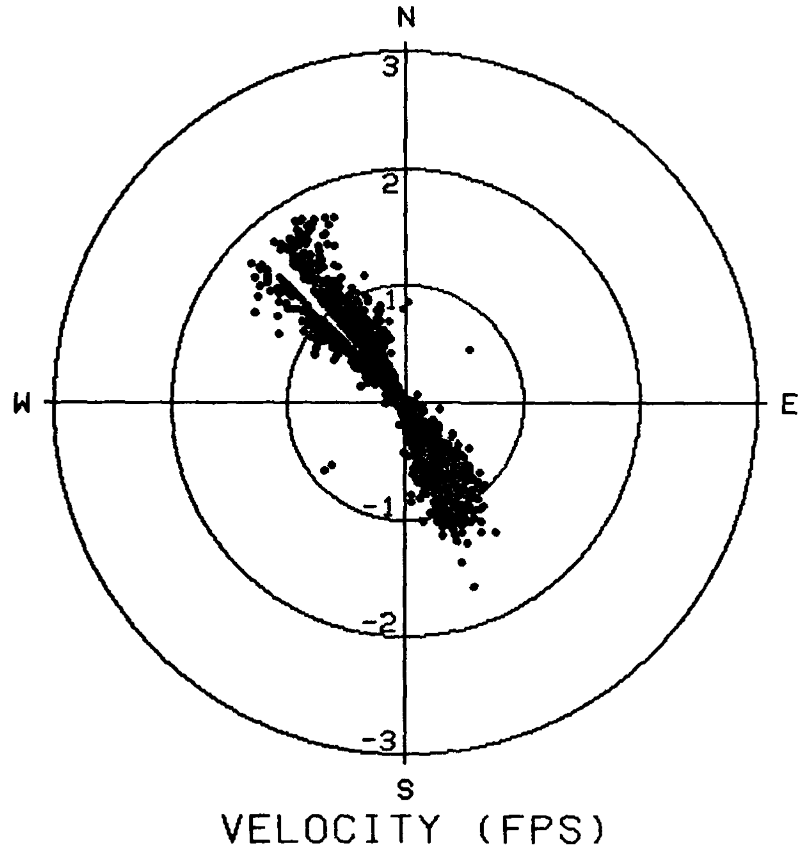

FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V6
DAY 276 TO DAY 318 1978
JULIAN DATE
1978
COMP VELOCITY (FPS)
FLOOD
EBB
276
283
290
297
304
311
318
4.0
2.0
0.0
-2.0
-4.0

PLATE 154



VELOCITY DATA SUMMARY
GAGE V8-9

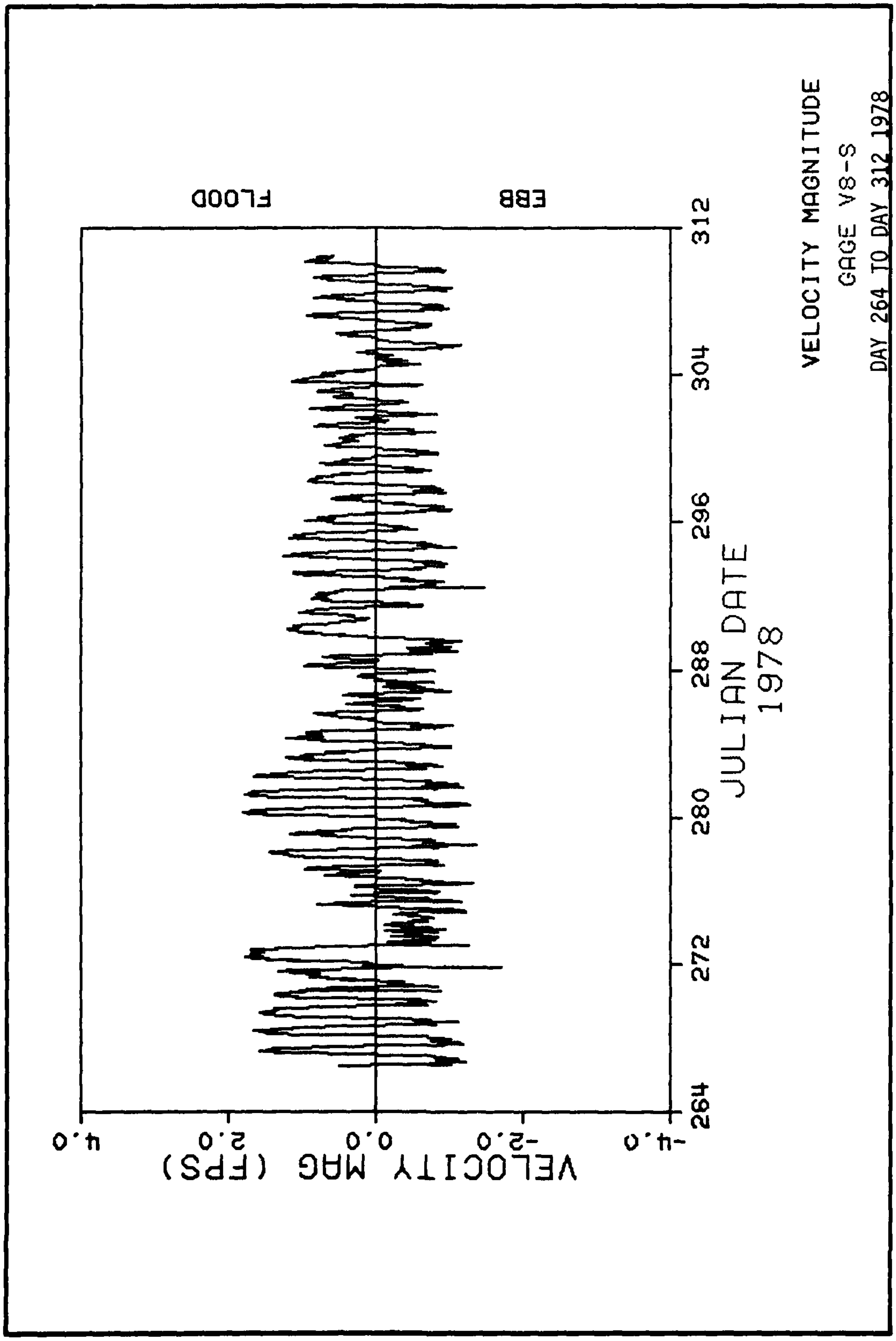
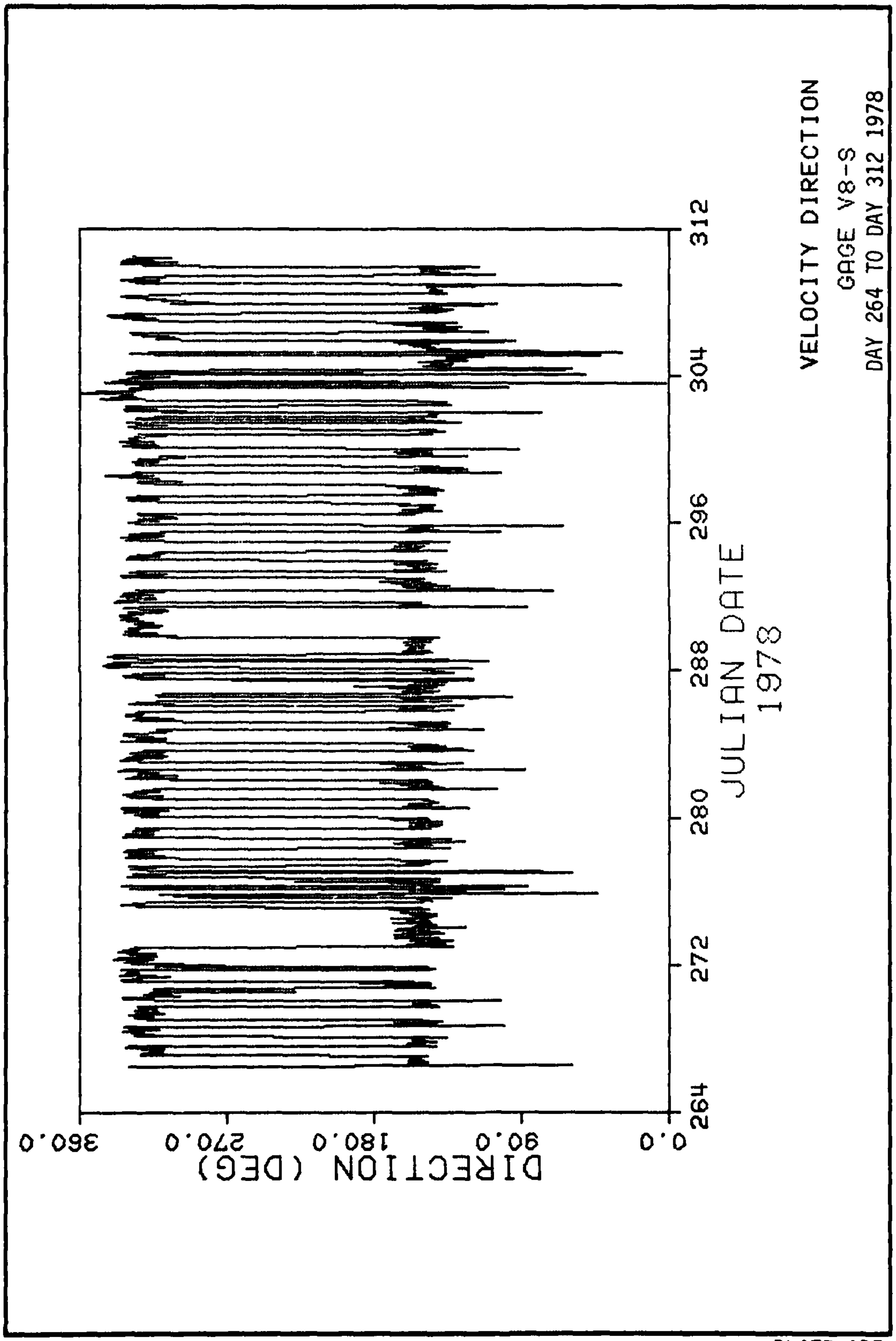

VELOCITY MAGNITUDE
GAGE V8-S
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312

PLATE 156


VELOCITY DIRECTION
GAGE V8-S
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
264
272
280
288
296
304
312

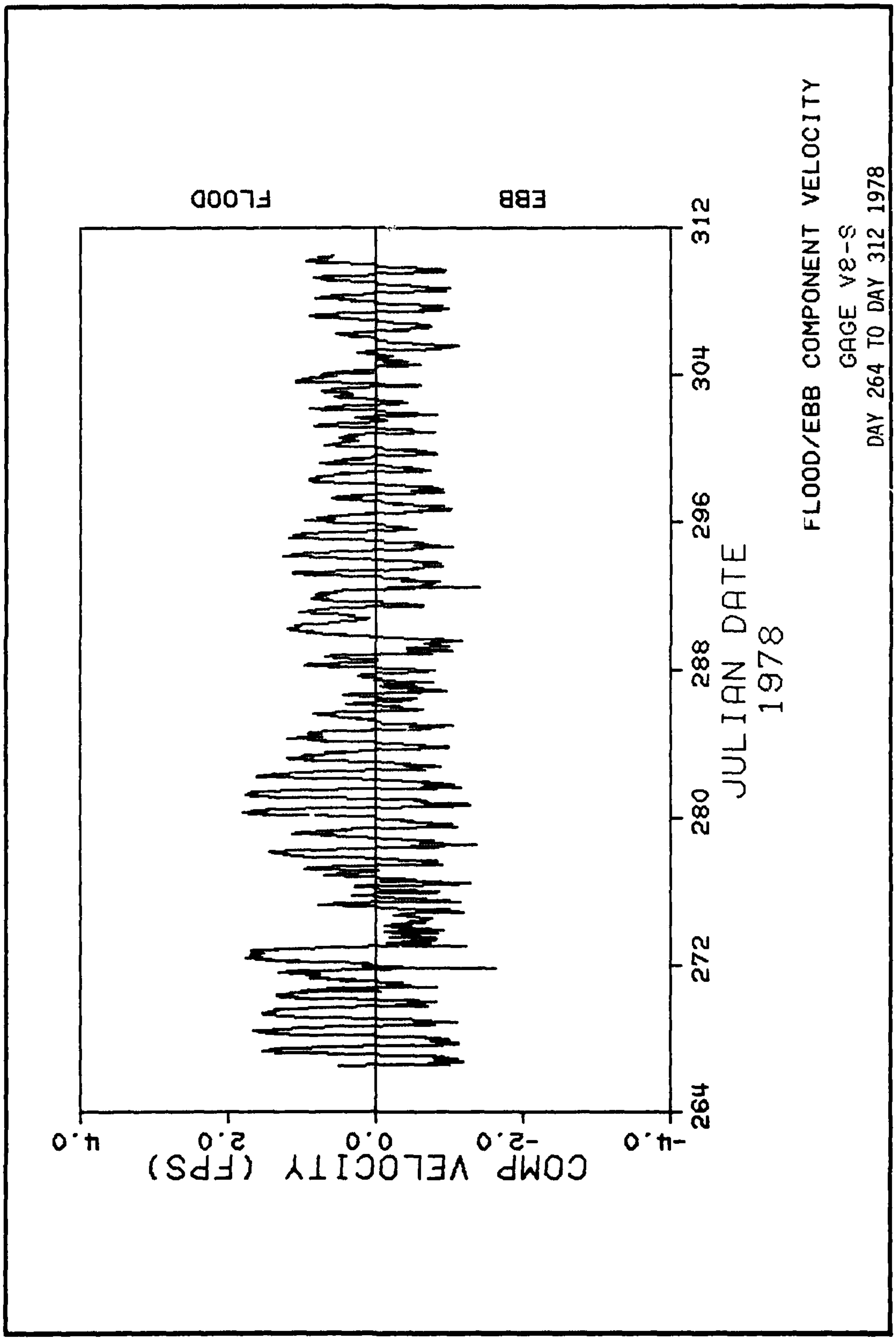
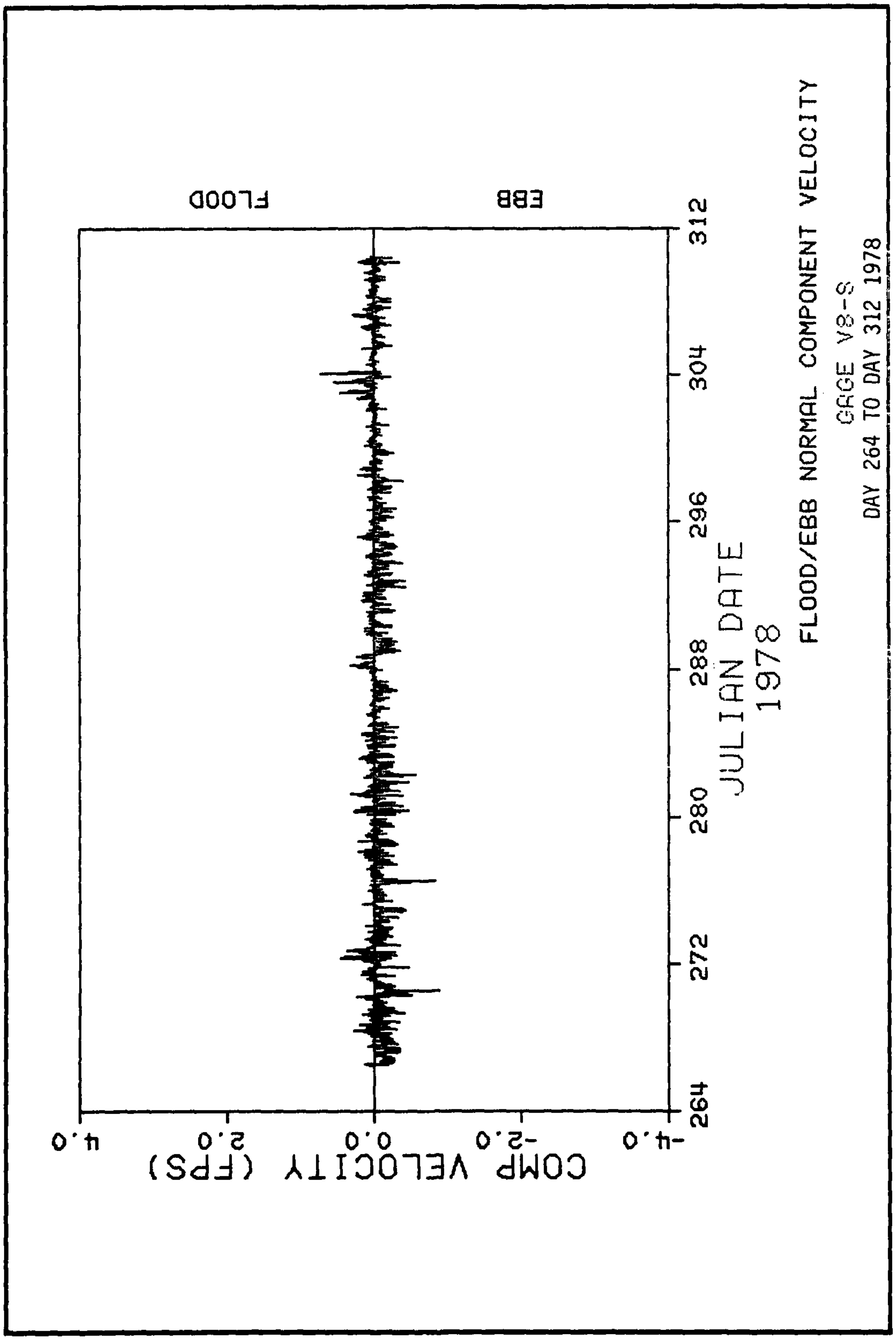

FLOOD/EBB COMPONENT VELOCITY
GAGE V8-S
DAY 264 TO DAY 312 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312
JULIAN DATE
1978

PLATE 58



FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312
JULIAN DATE
1978
FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V8-S
DAY 264 TO DAY 312 1978

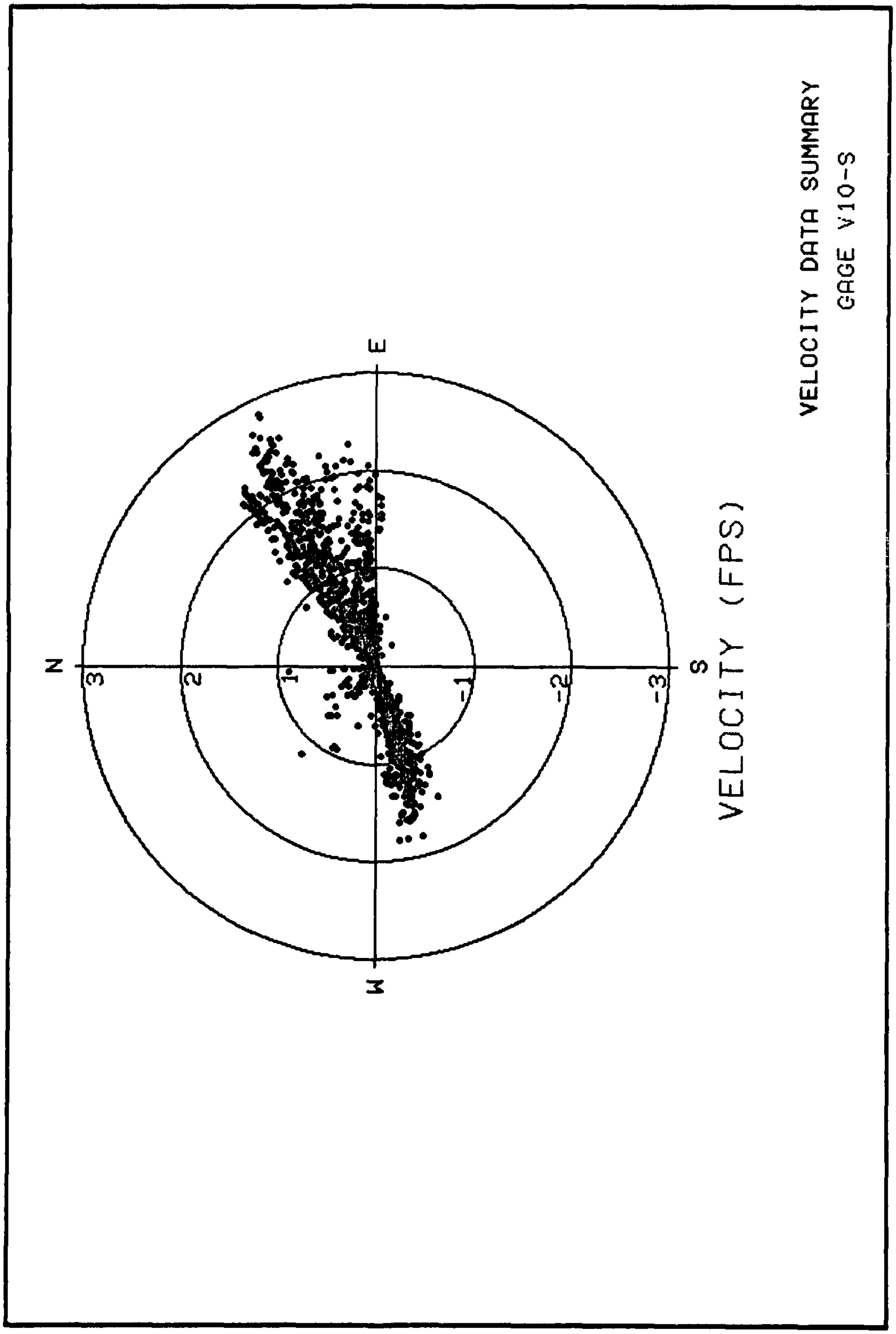
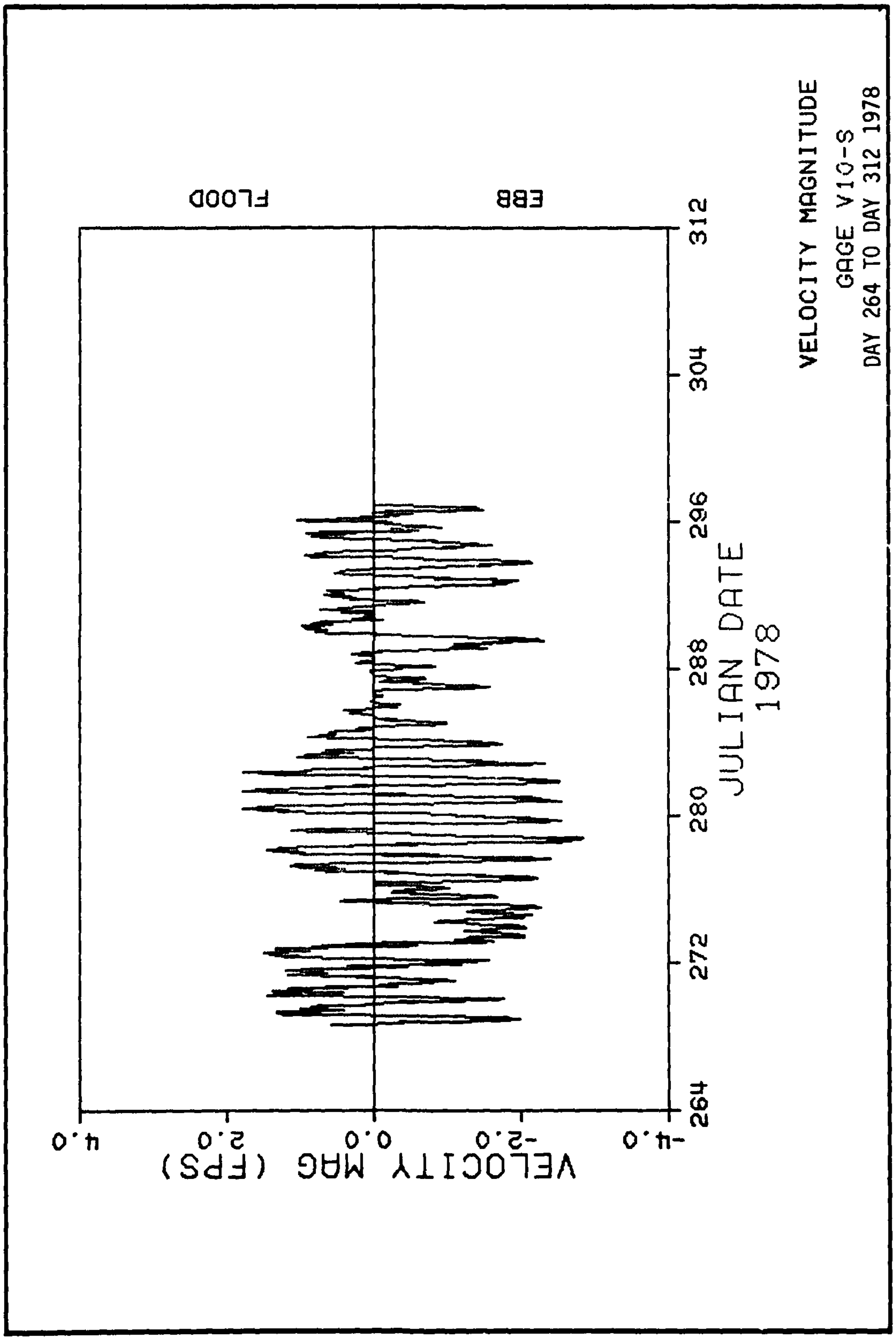


PLATE 160


VELOCITY MAGNITUDE
GAGE V10-S
DAY 264 TO DAY 312 1978
FLOOD
EBB
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312
JULIAN DATE
1978

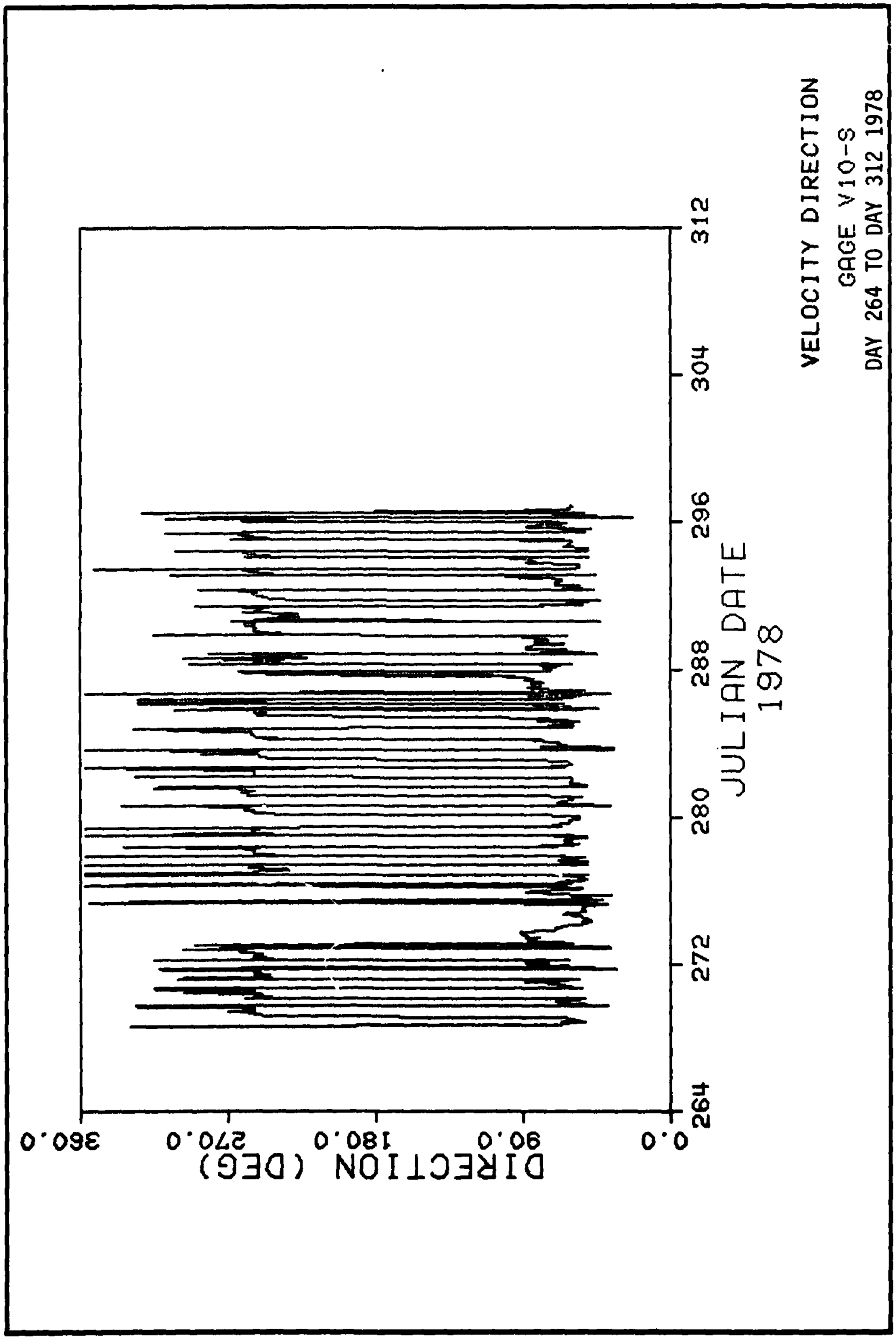
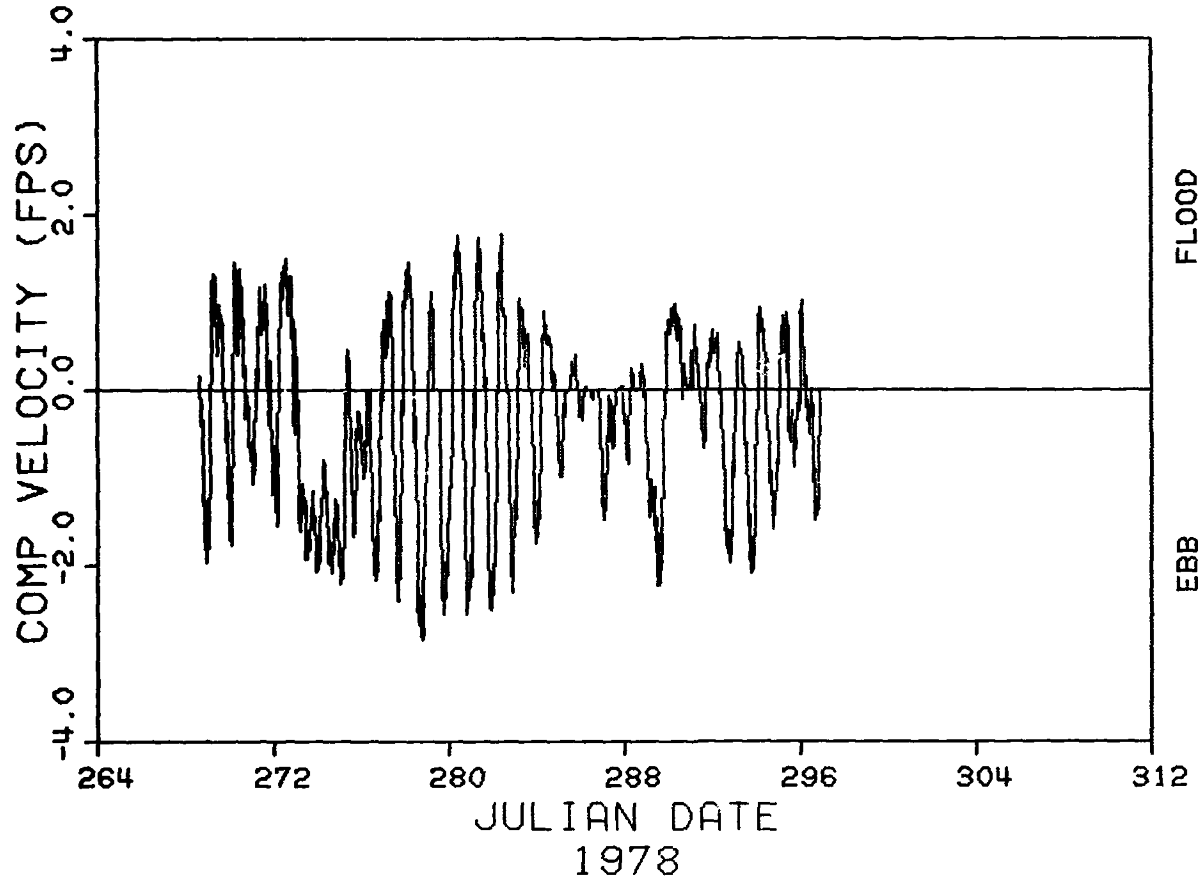

VELOCITY DIRECTION
GAGE V10-S
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
264
272
280
288
296
304
312

PLATE 162



FLOOD/EBB COMPONENT VELOCITY
GAGE V10-S
DAY 264 TO DAY 312 1978

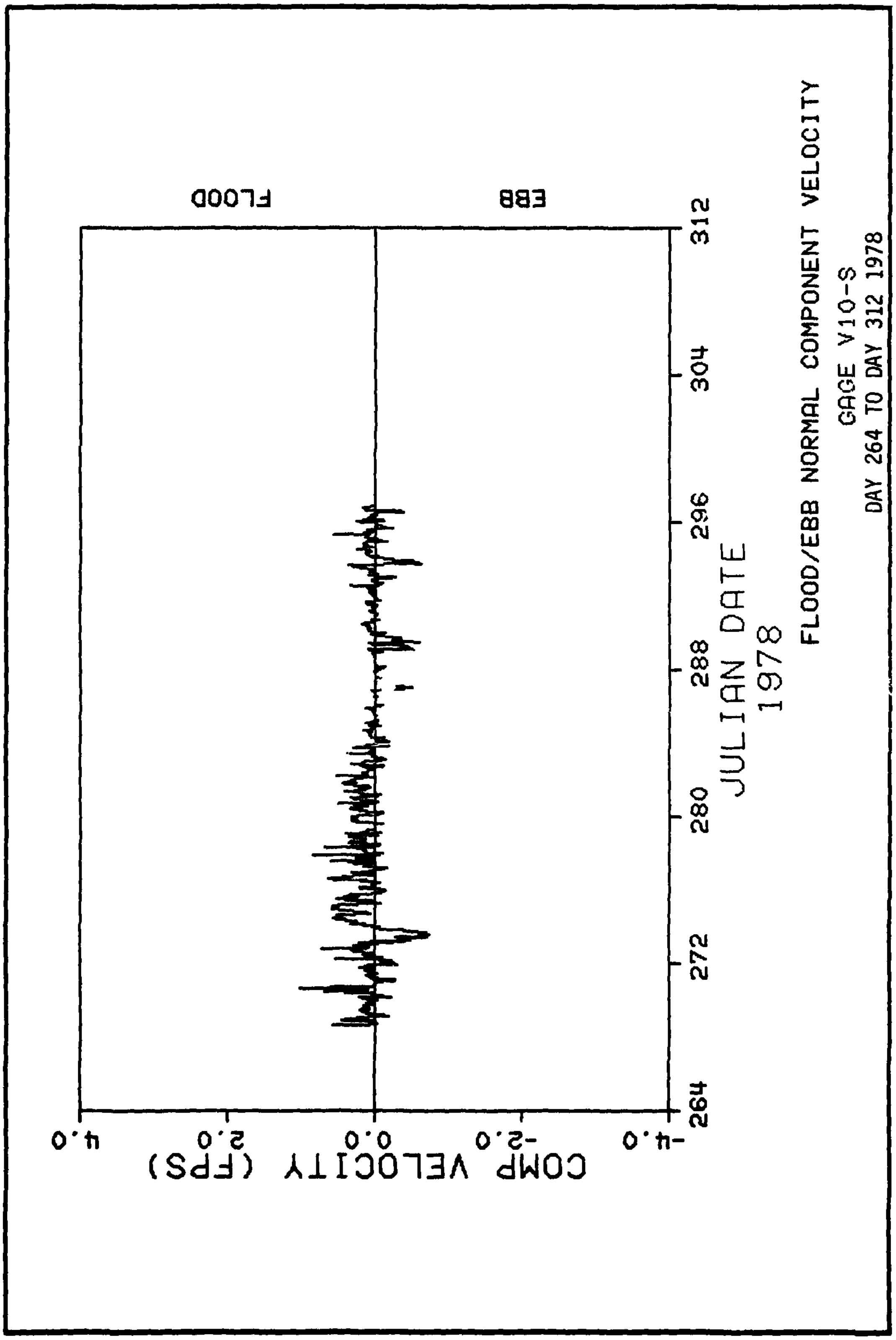
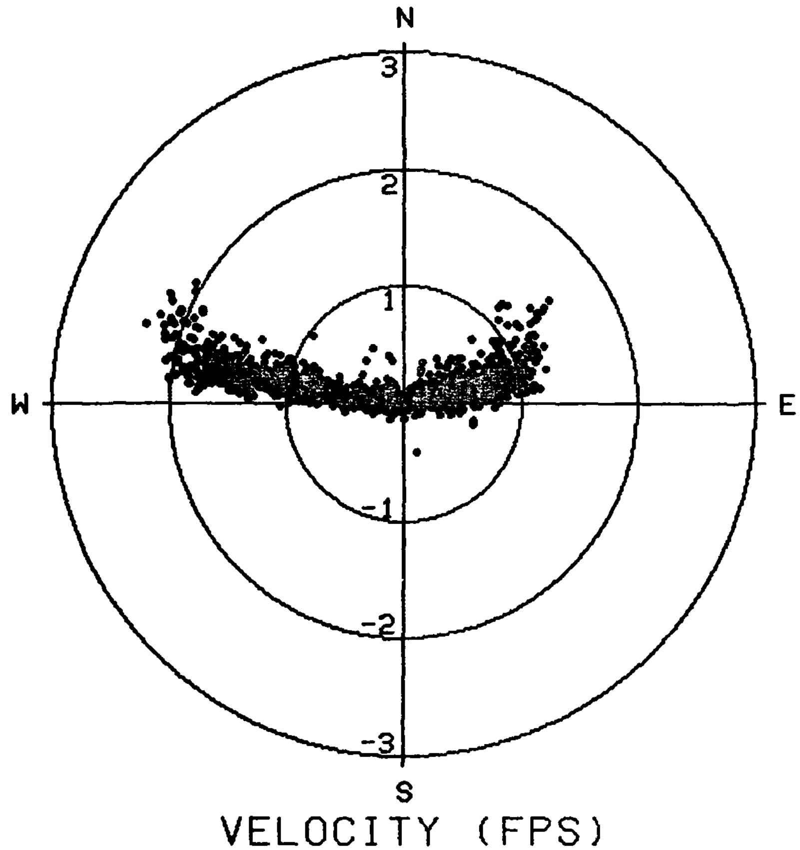
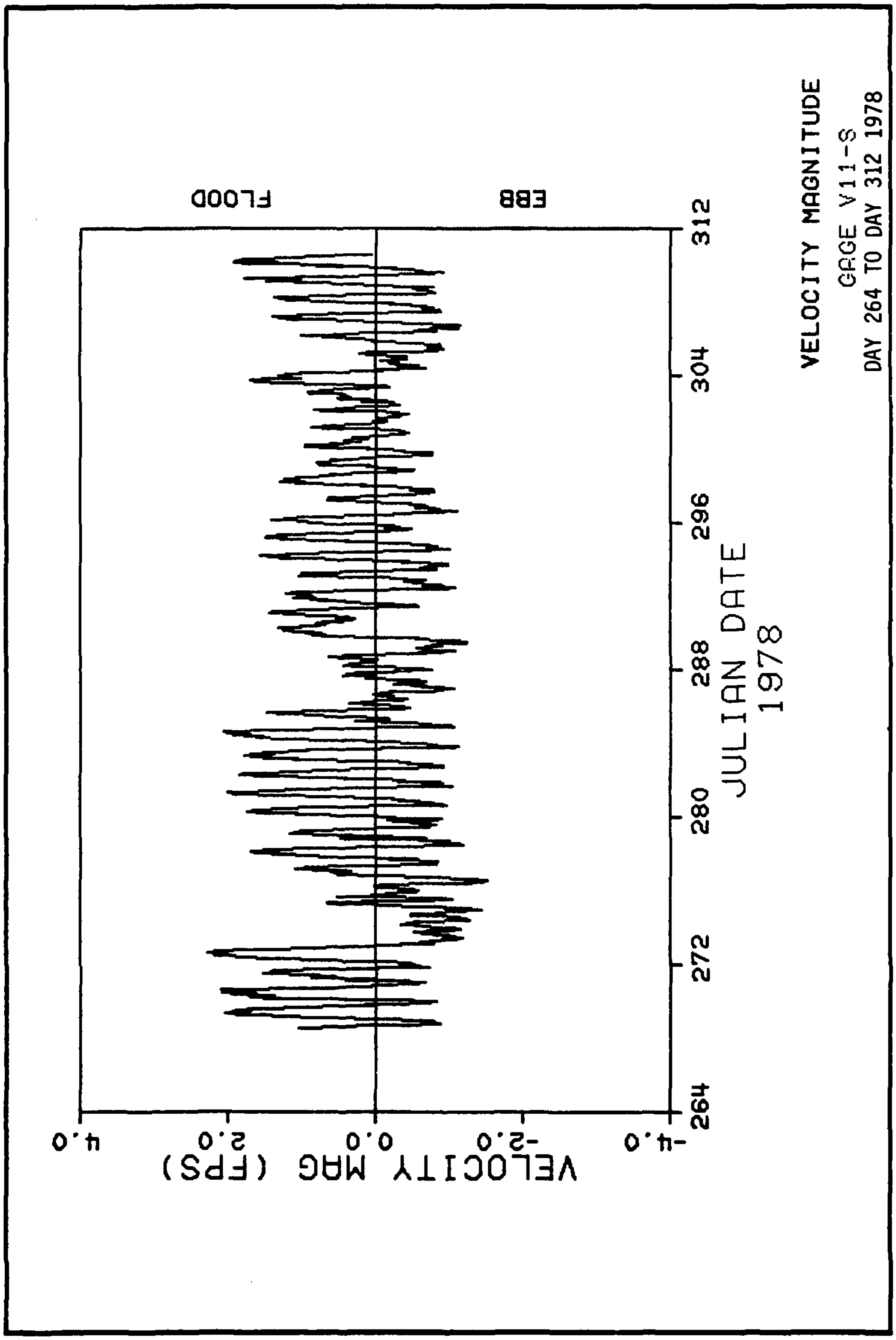

FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V10-S
DAY 264 TO DAY 312 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1978
264
272
280
288
296
304
312

PLATE 164



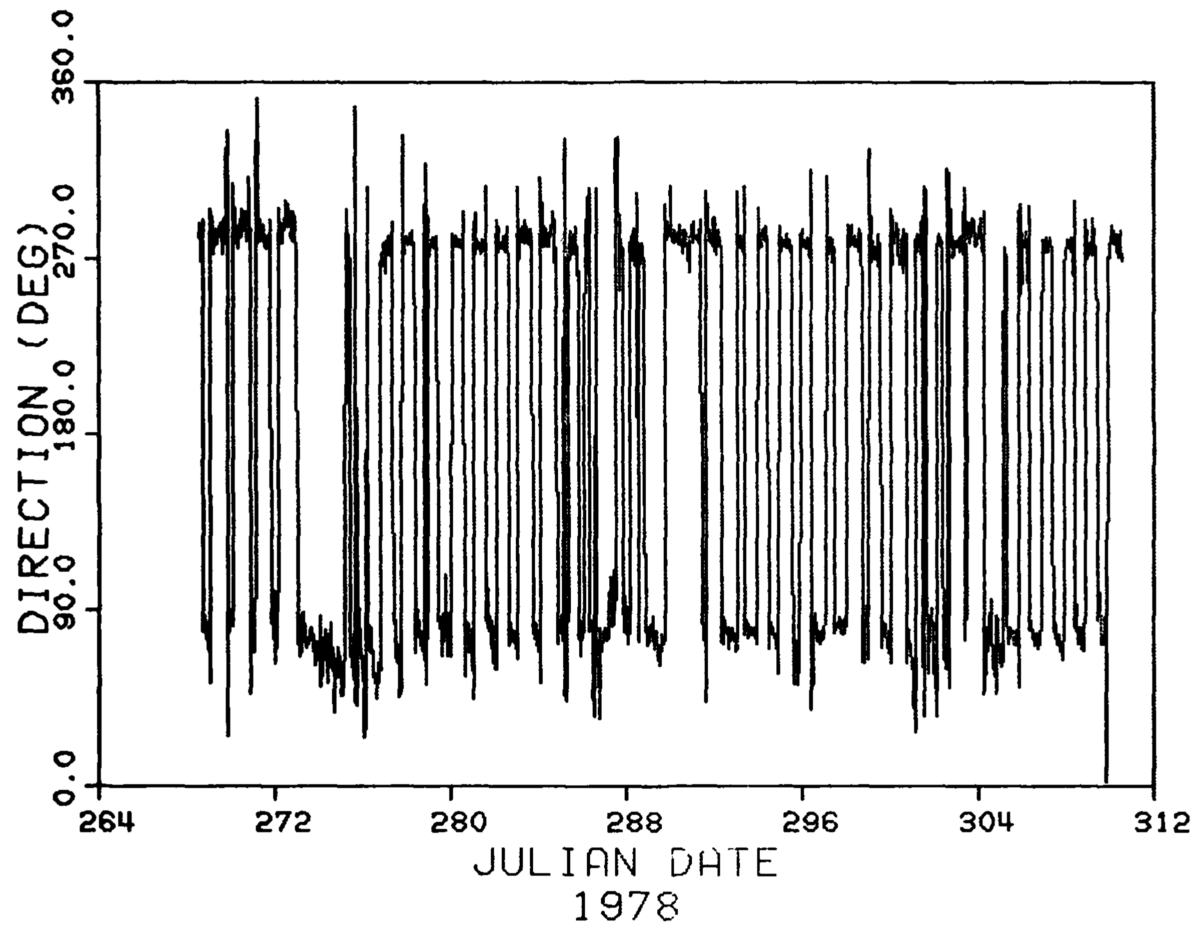
VELOCITY DATA SUMMARY

GAGE V11-S



VELOCITY MAGNITUDE
GAGE V11-S
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312

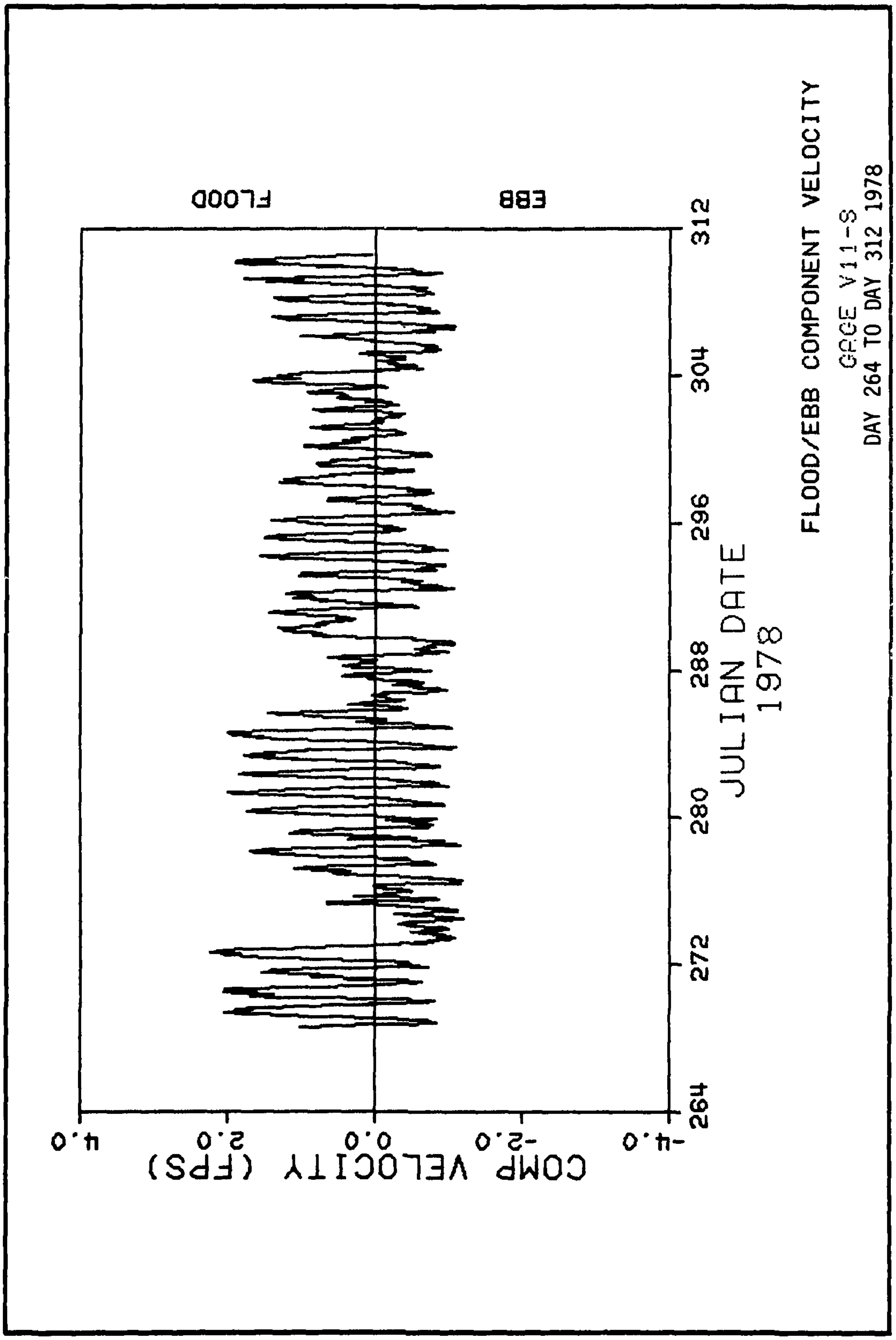
PLATE 166



VELOCITY DIRECTION

GAGE

DAY 264 TO DAY 312 1978



FLOOD/EBB COMPONENT VELOCITY
GAGE V11-S
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
COMP VELOCITY (FPS)
FLOOD
EBB
264
272
280
288
296
304
312
4.0
2.0
0.0
-2.0
-4.0

PLATE 168

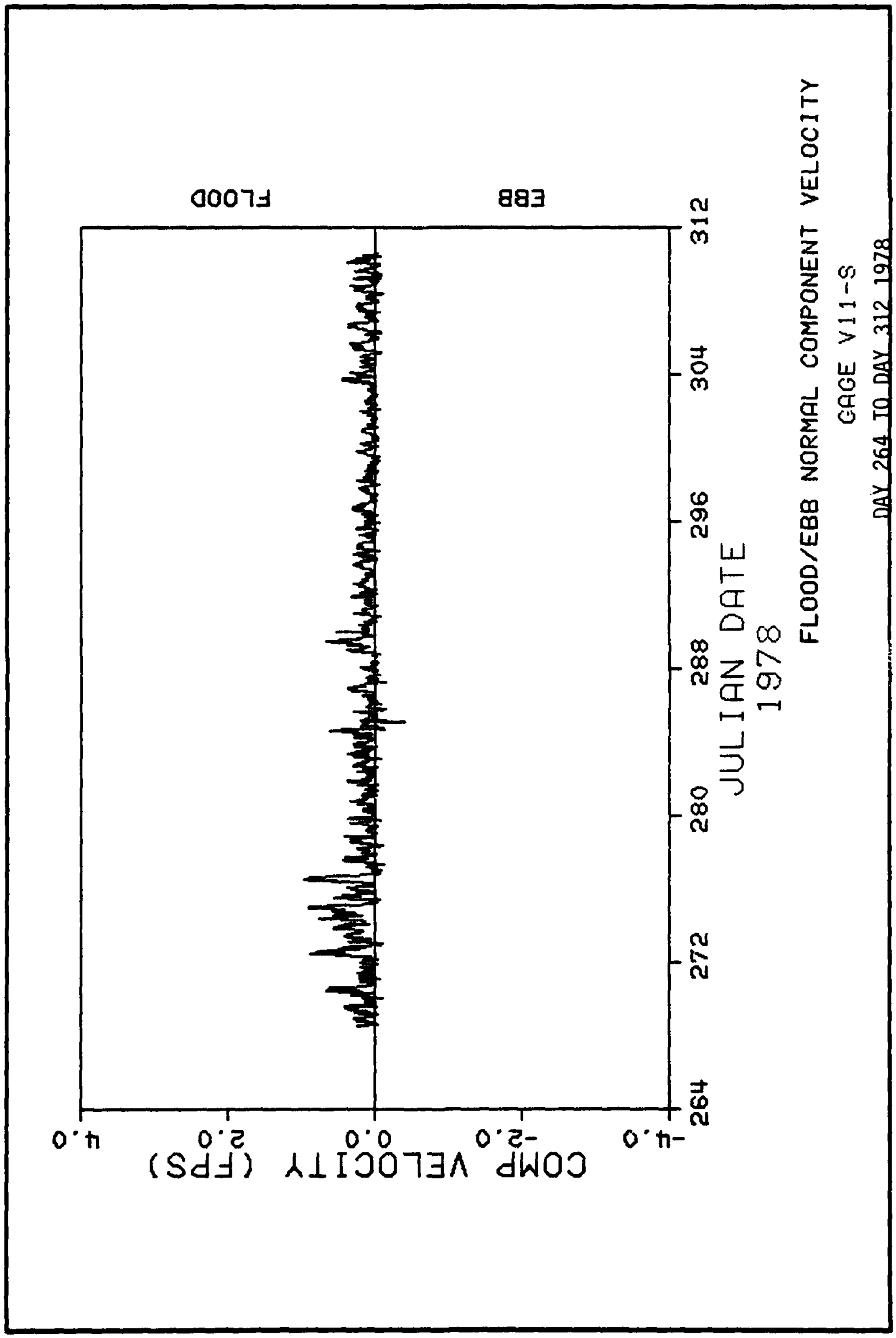

FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V11-S
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
COMP VELOCITY (FPS)
FLOOD
EBB
264
272
280
288
296
304
312
4.0
2.0
0.0
-2.0
-4.0

PLATE 169

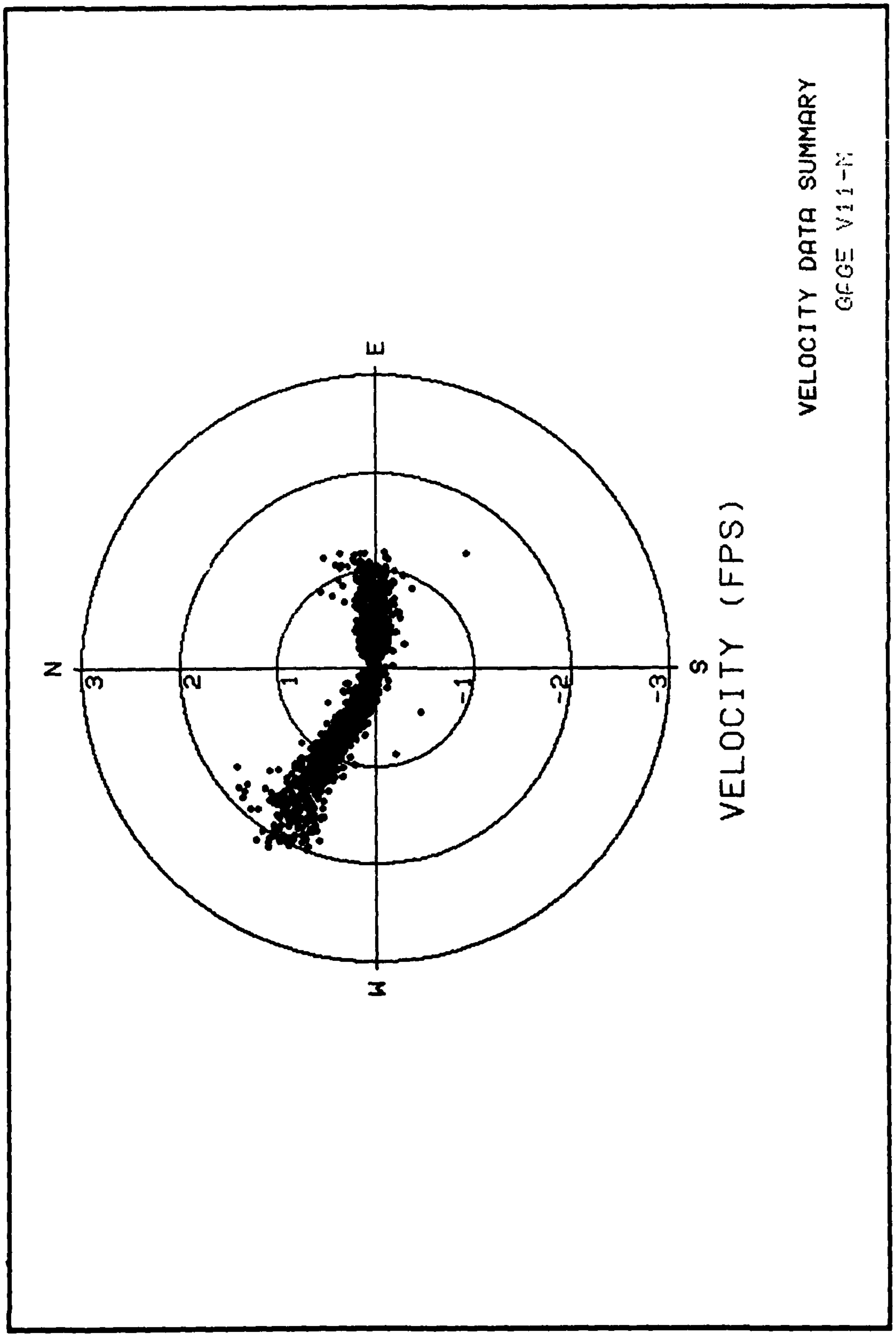


PLATE 170

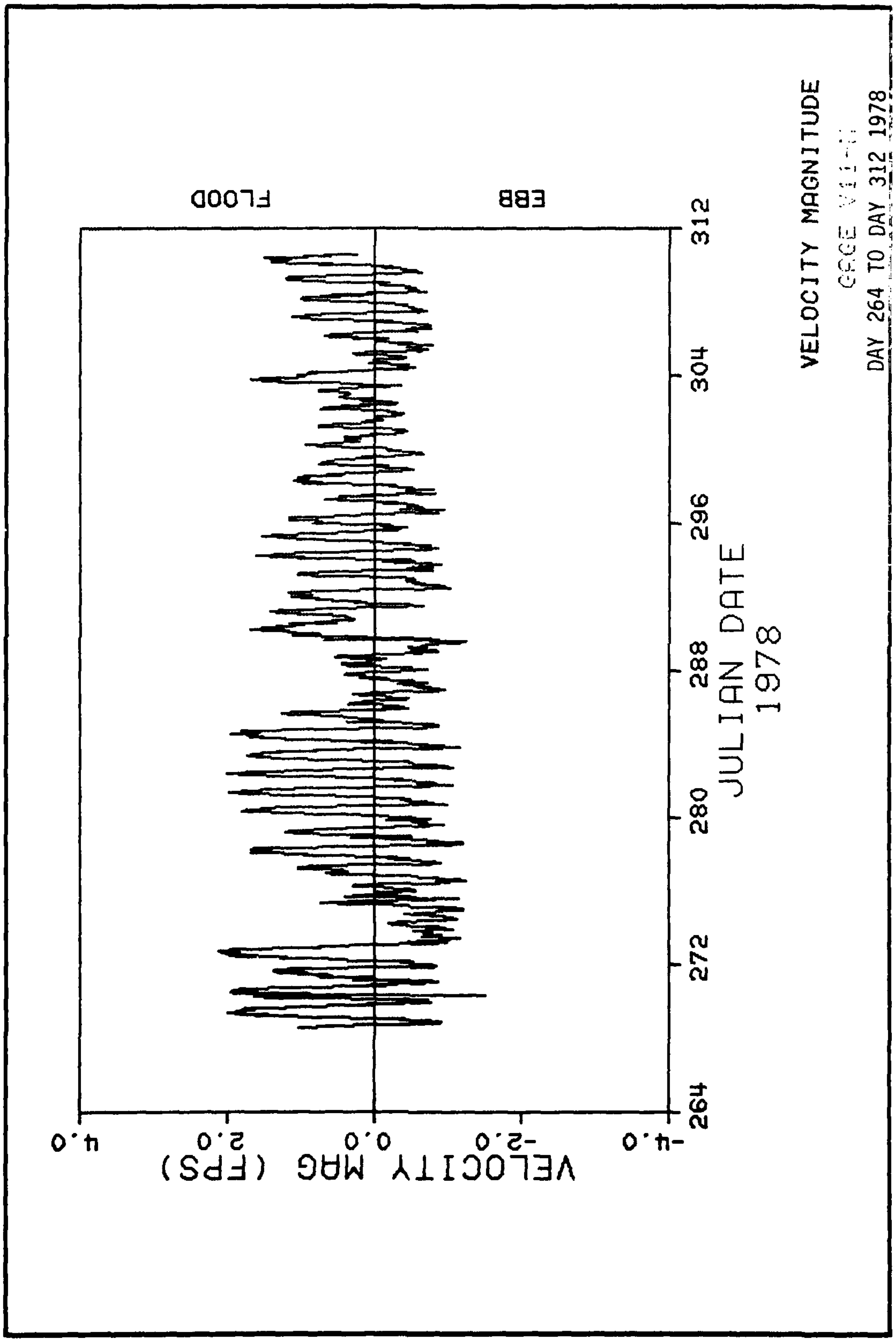

VELOCITY MAGNITUDE
DAY 264 TO DAY 312 1978
FLOOD
EBB
4.0
2.0
0.0
-2.0
-4.0
VELOCITY MAG (FPS)
264
272
280
288
296
304
312
JULIAN DATE
1978

PLATE 171

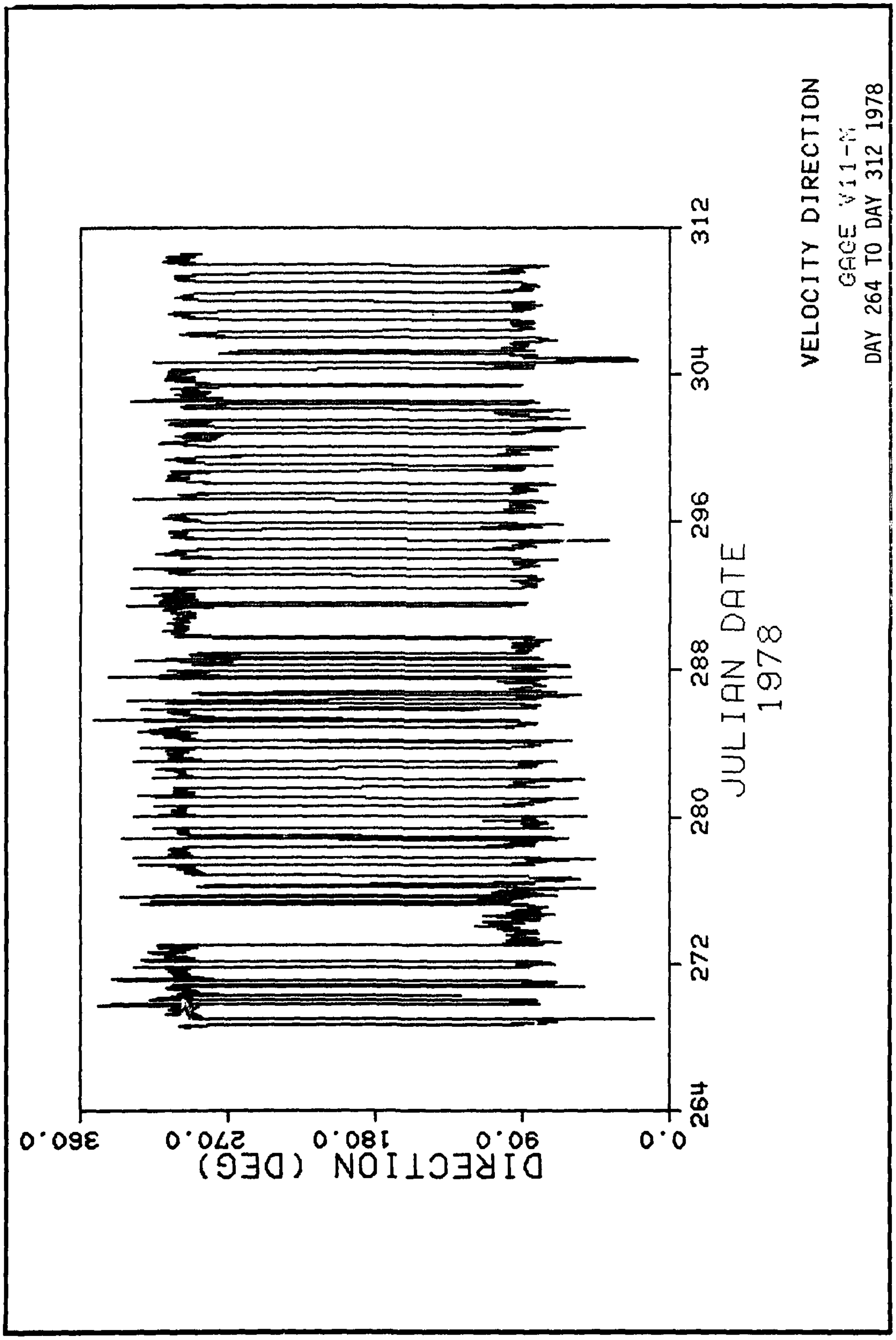
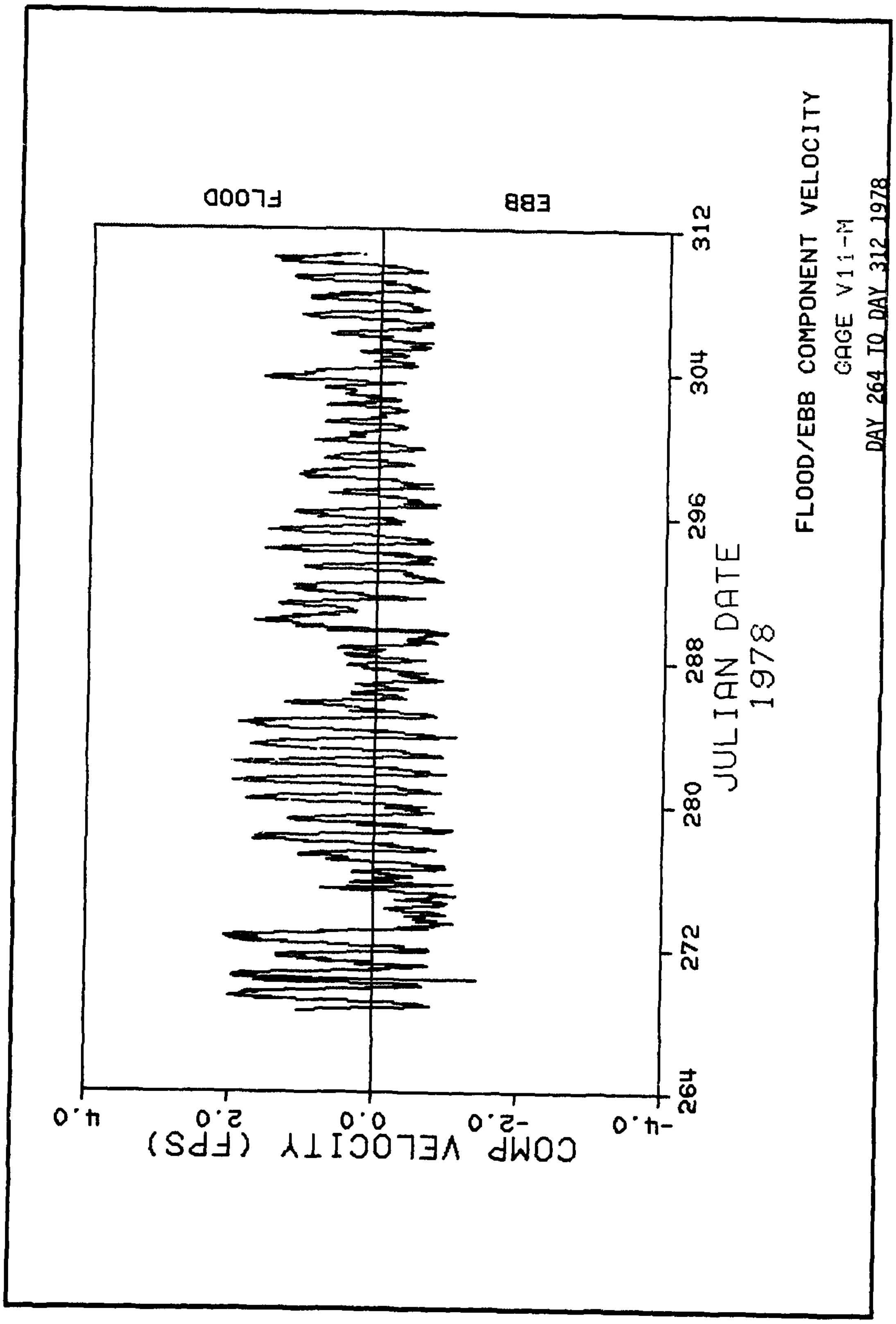
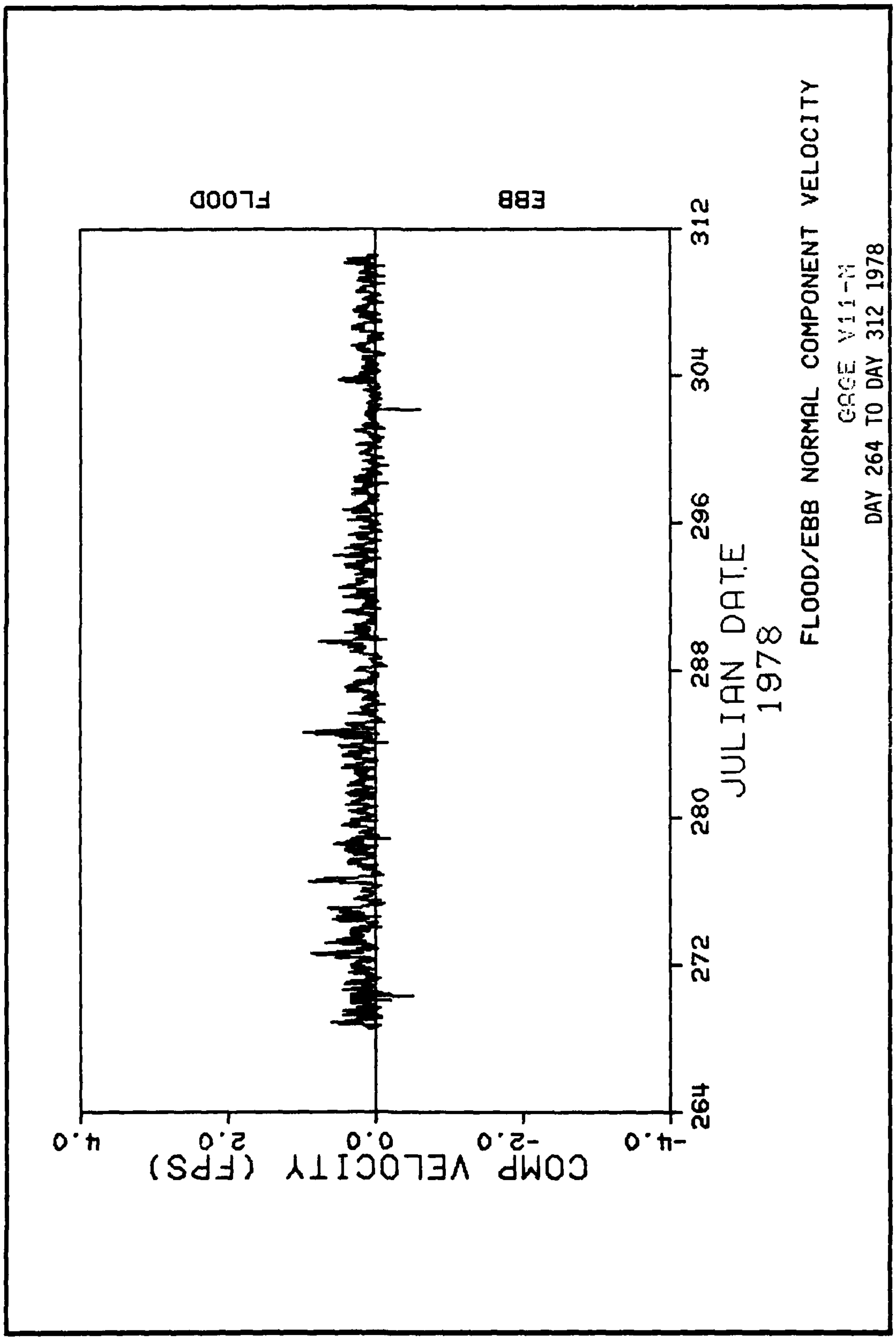
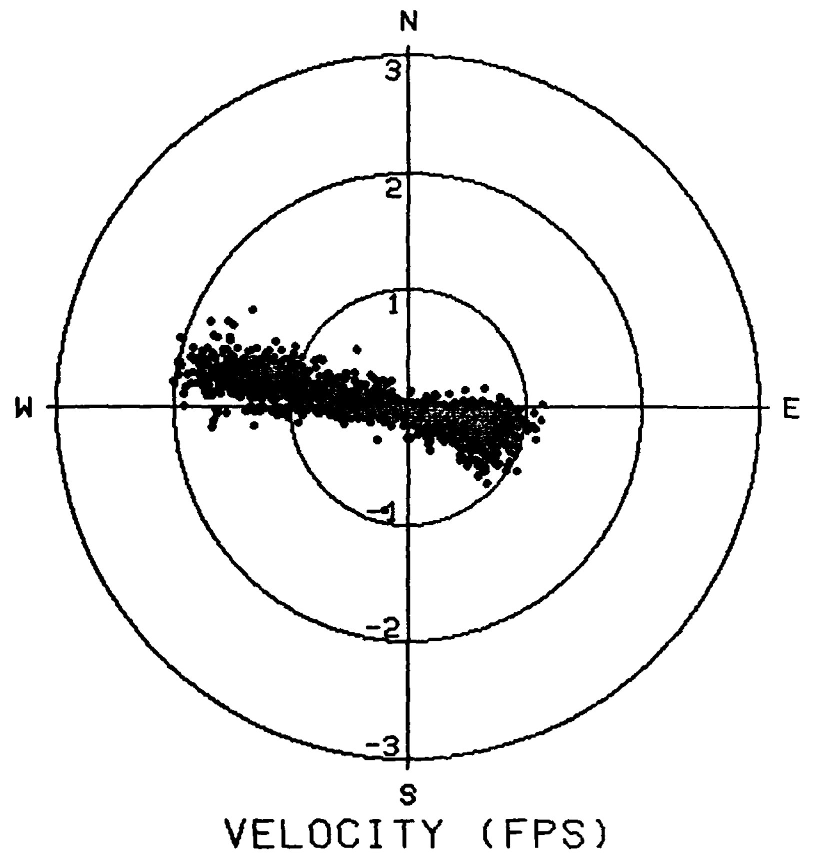

VELOCITY DIRECTION
GAGE V11-M
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
264
272
280
288
296
304
312

PLATE 172


FLOOD/EBB COMPONENT VELOCITY
GAGE V11-M
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
264
272
280
288
296
304
312
COMP VELOCITY (FPS)
-4.0
-2.0
0.0
2.0
4.0



FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V11-M
DAY 264 TO DAY 312 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1978
264
272
280
288
296
304
312



VELOCITY DATA SUMMARY

GAGE V11-B

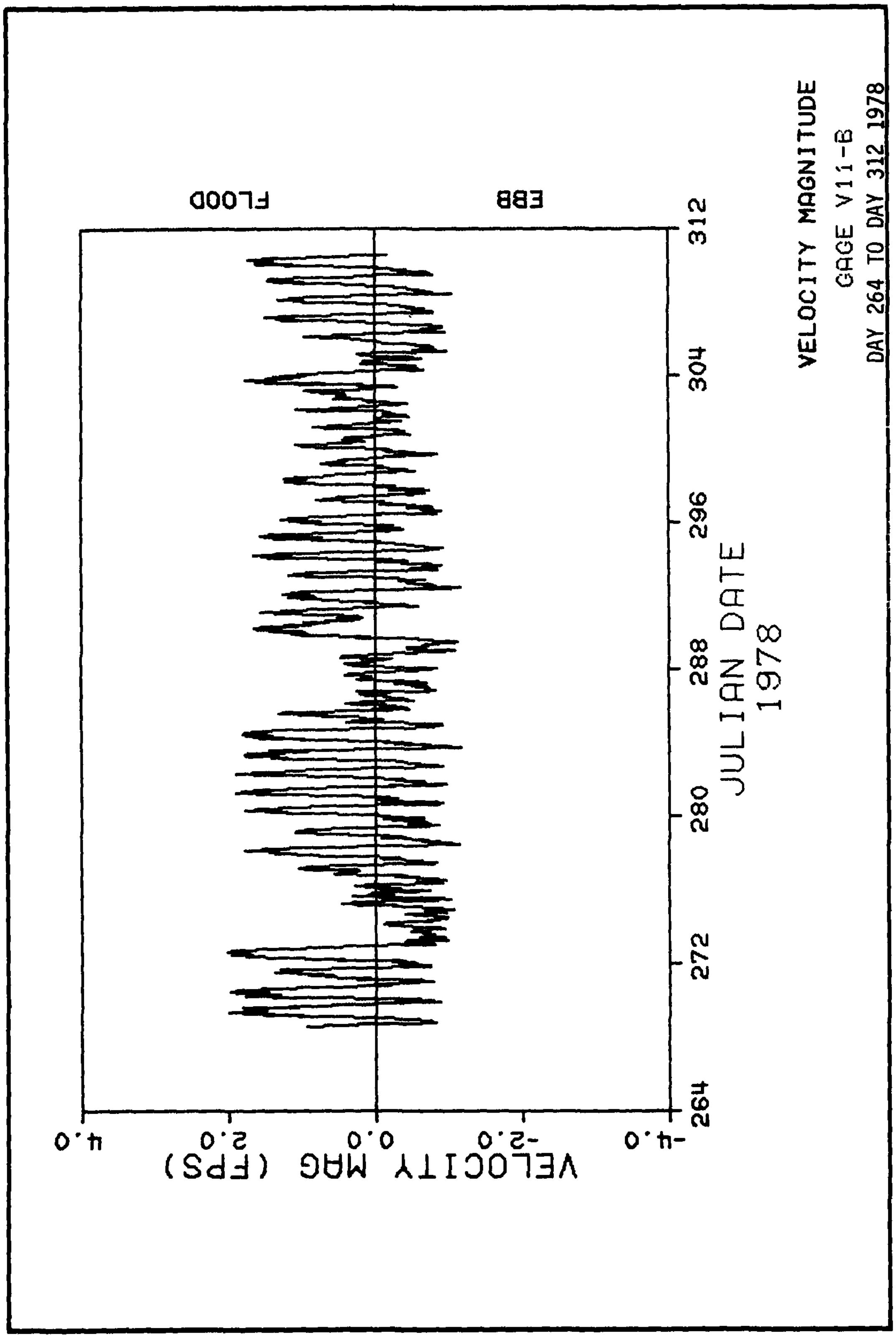

VELOCITY MAGNITUDE
GAGE V11-B
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
VELOCITY MAG (FPS)
264
272
280
288
296
304
312
4.0
2.0
0.0
-2.0
-4.0

PLATE 176

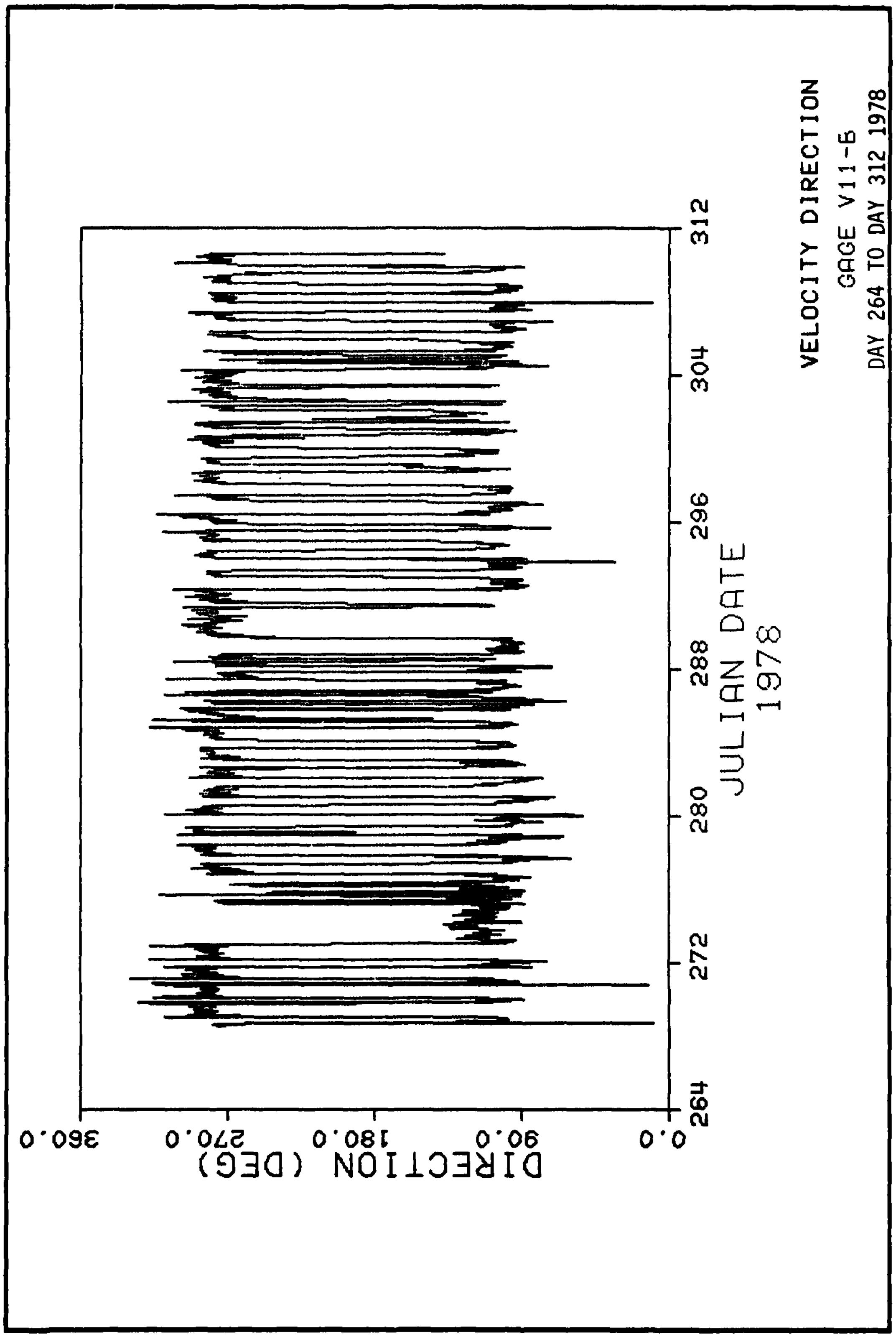

VELOCITY DIRECTION
GAGE V11-6
DAY 264 TO DAY 312 1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
JULIAN DATE
1978
264
272
280
288
296
304
312

PLATE 177

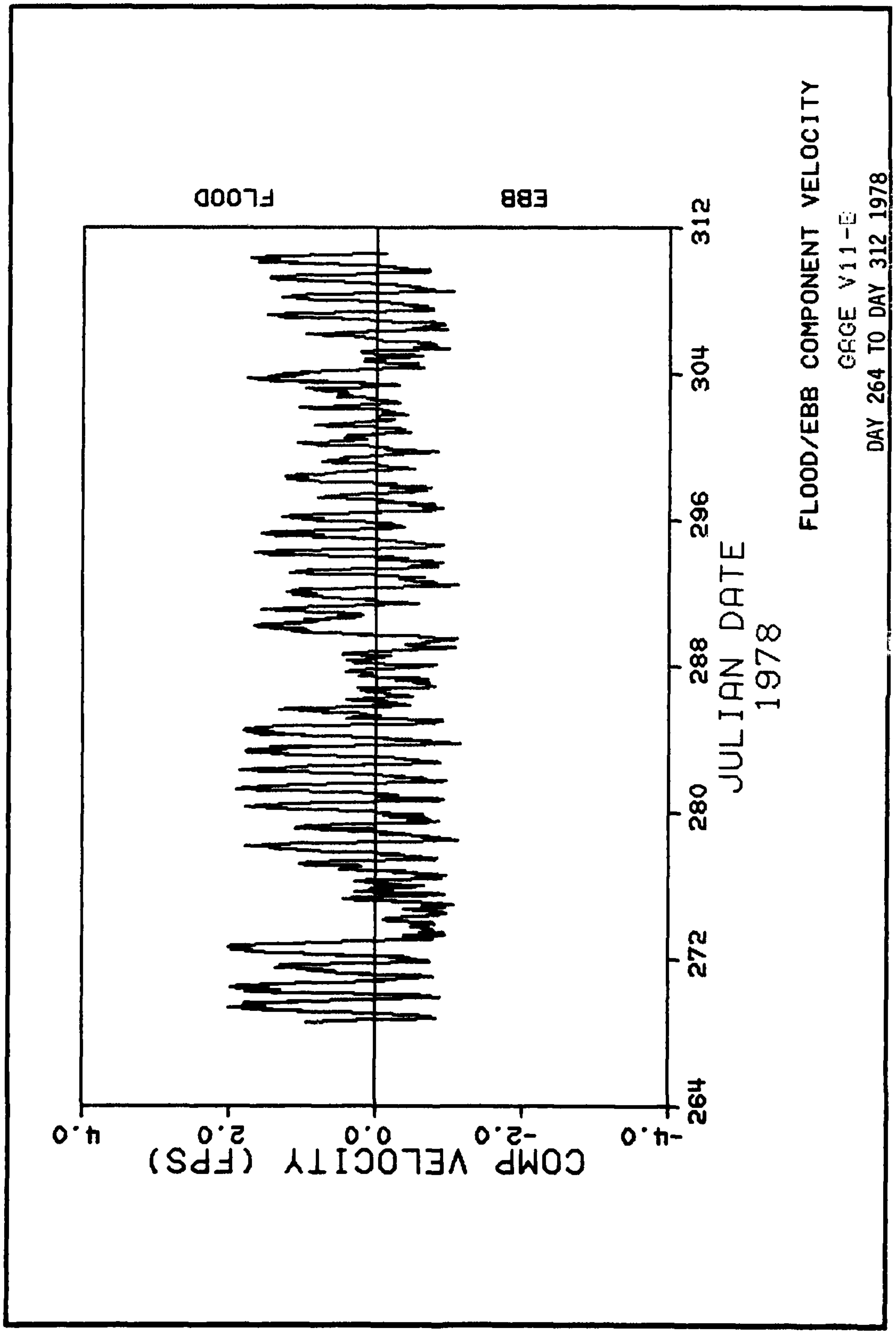

FLOOD/EBB COMPONENT VELOCITY
GAGE V11-B
DAY 264 TO DAY 312 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312
JULIAN DATE
1978

PLATE 178

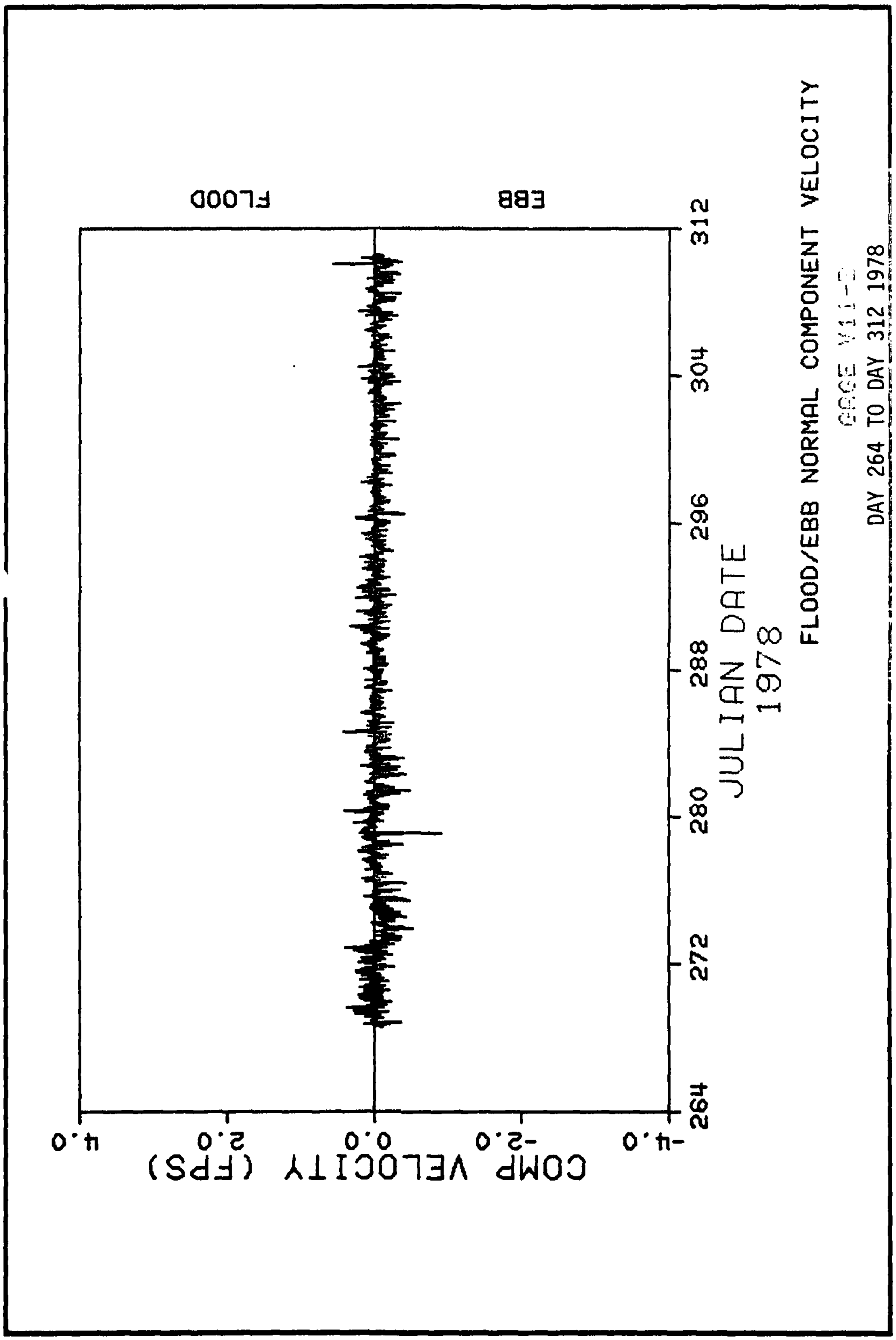
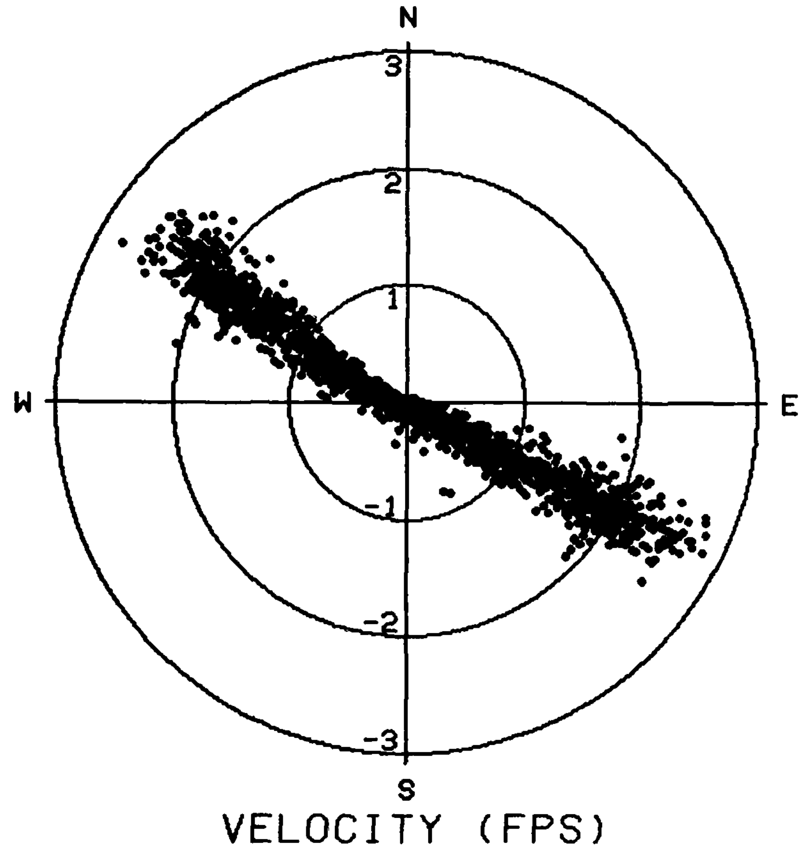

FLOOD/EBB NORMAL COMPONENT VELOCITY
DAY 264 TO DAY 312 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1978
264
272
280
288
296
304
312

PLATE 179



VELOCITY DATA SUMMARY

GAGE V12-S

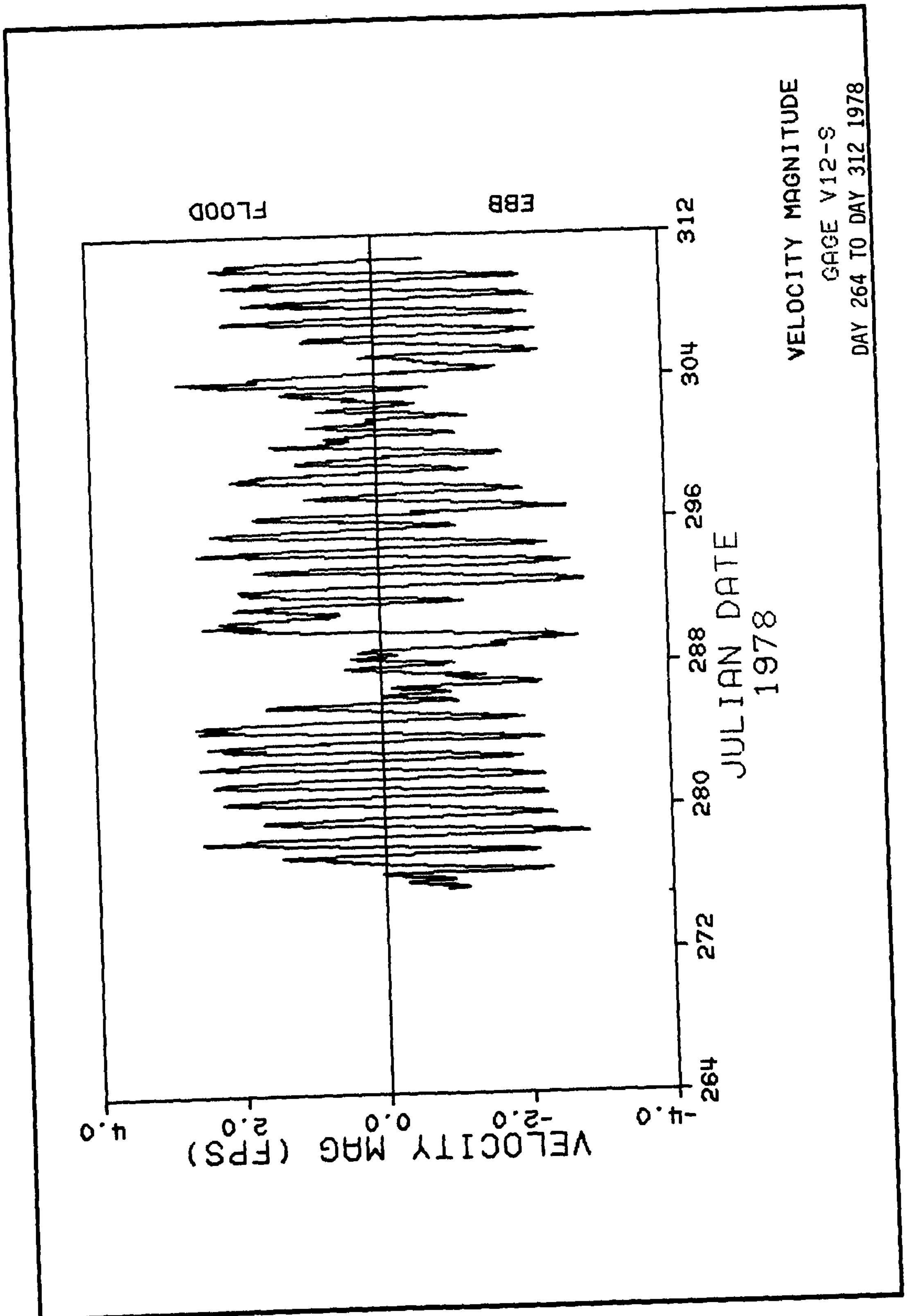

VELOCITY MAGNITUDE
GAGE V12-S
DAY 264 TO DAY 312 1978
FLOOD
EBB
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312
JULIAN DATE
1978

PLATE 181

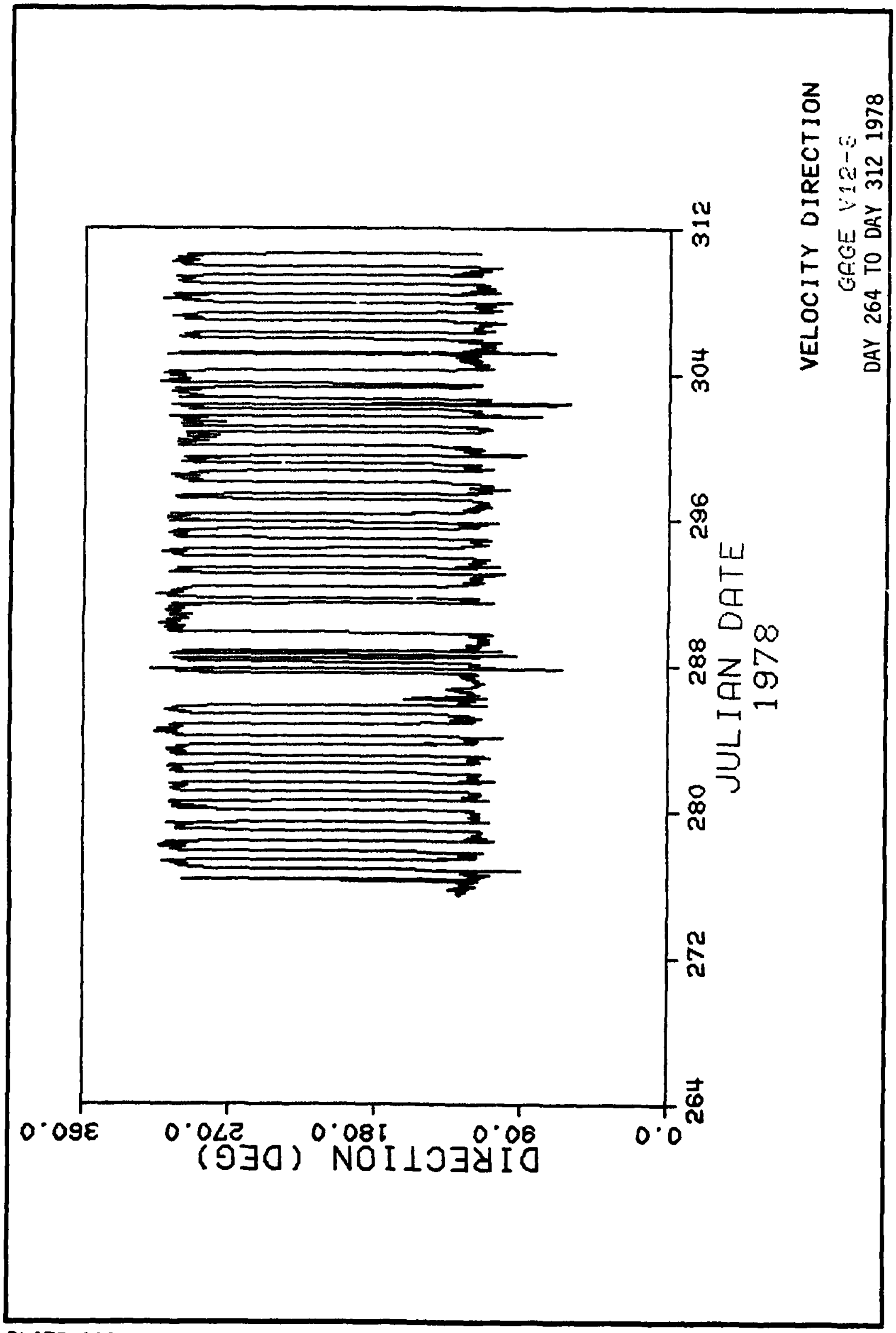

VELOCITY DIRECTION
GAGE V12-S
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
264
272
280
288
296
304
312

PLATE 182

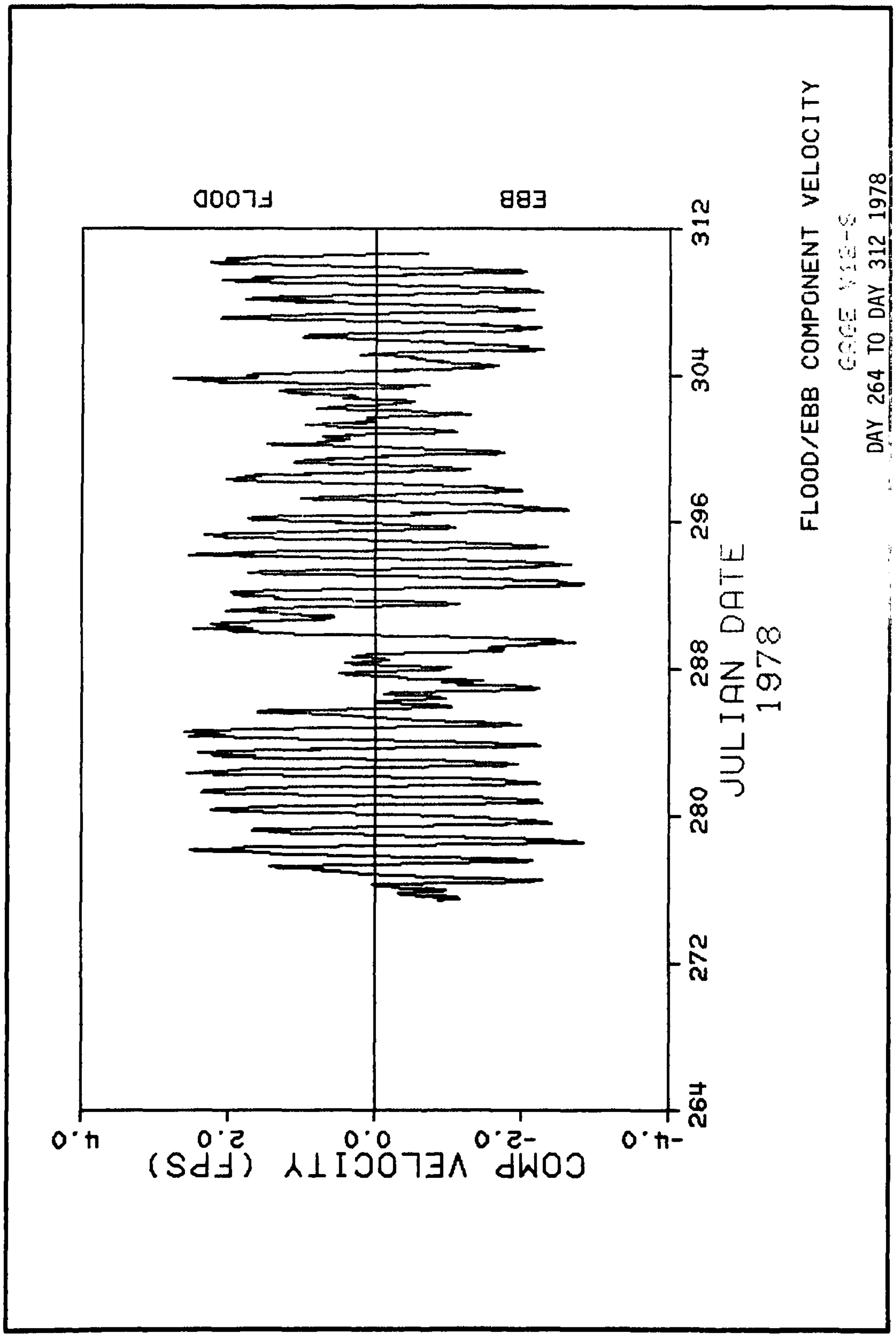
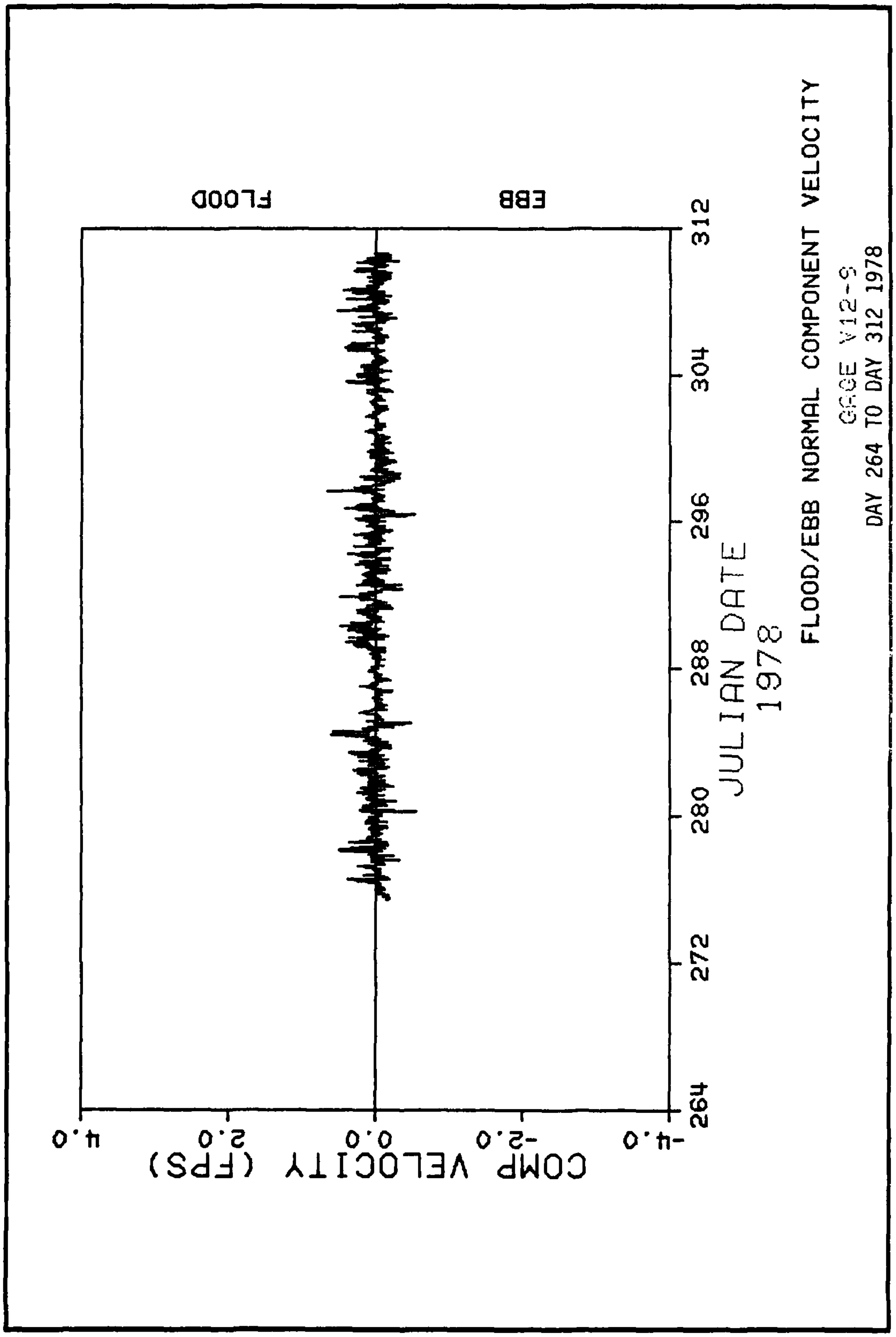
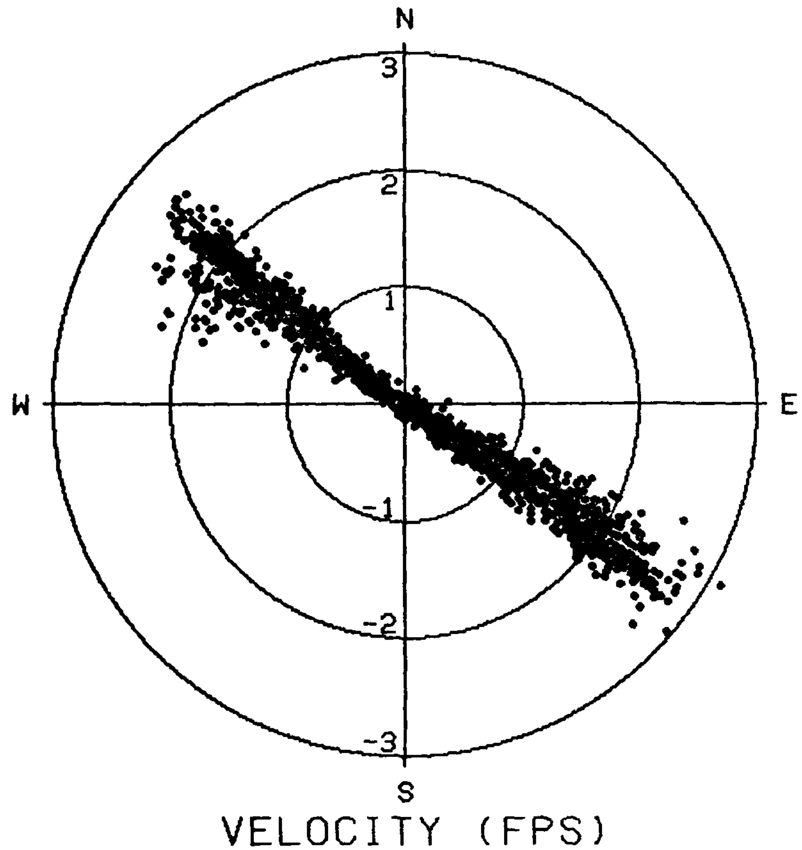

FLOOD/EBB COMPONENT VELOCITY
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
264
272
280
288
296
304
312
COMP VELOCITY (FPS)
-4.0
-2.0
0.0
2.0
4.0

PLATE 183



FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V12-9
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
COMP VELOCITY (FPS)
FLOOD
EBB
264
272
280
288
296
304
312
4.0
2.0
0.0
-2.0
-4.0

PLATE 184



VELOCITY DATA SUMMARY
GAGE V12-M

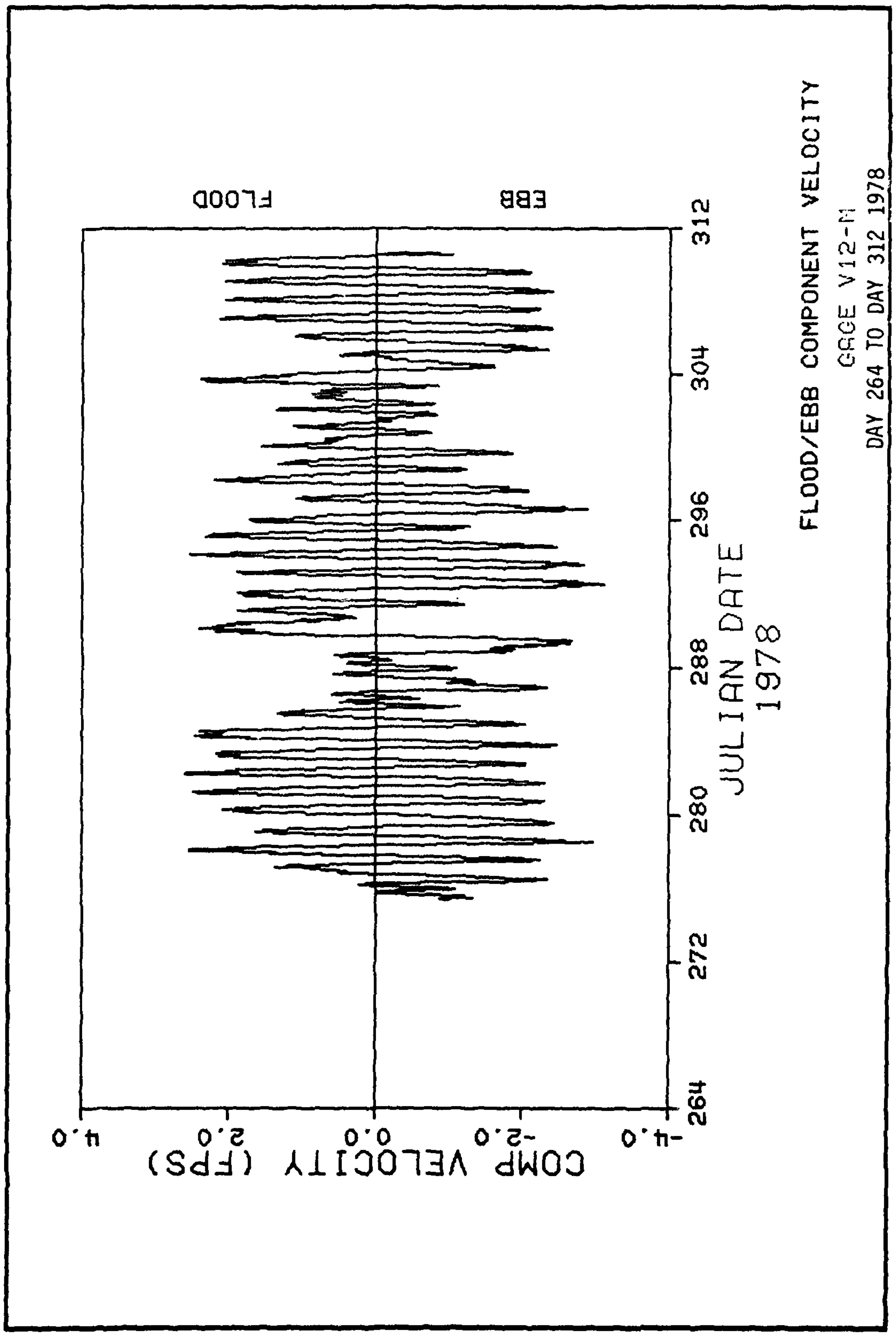

FLOOD/EBB COMPONENT VELOCITY
GAGE V12-M
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312

PLATE 186

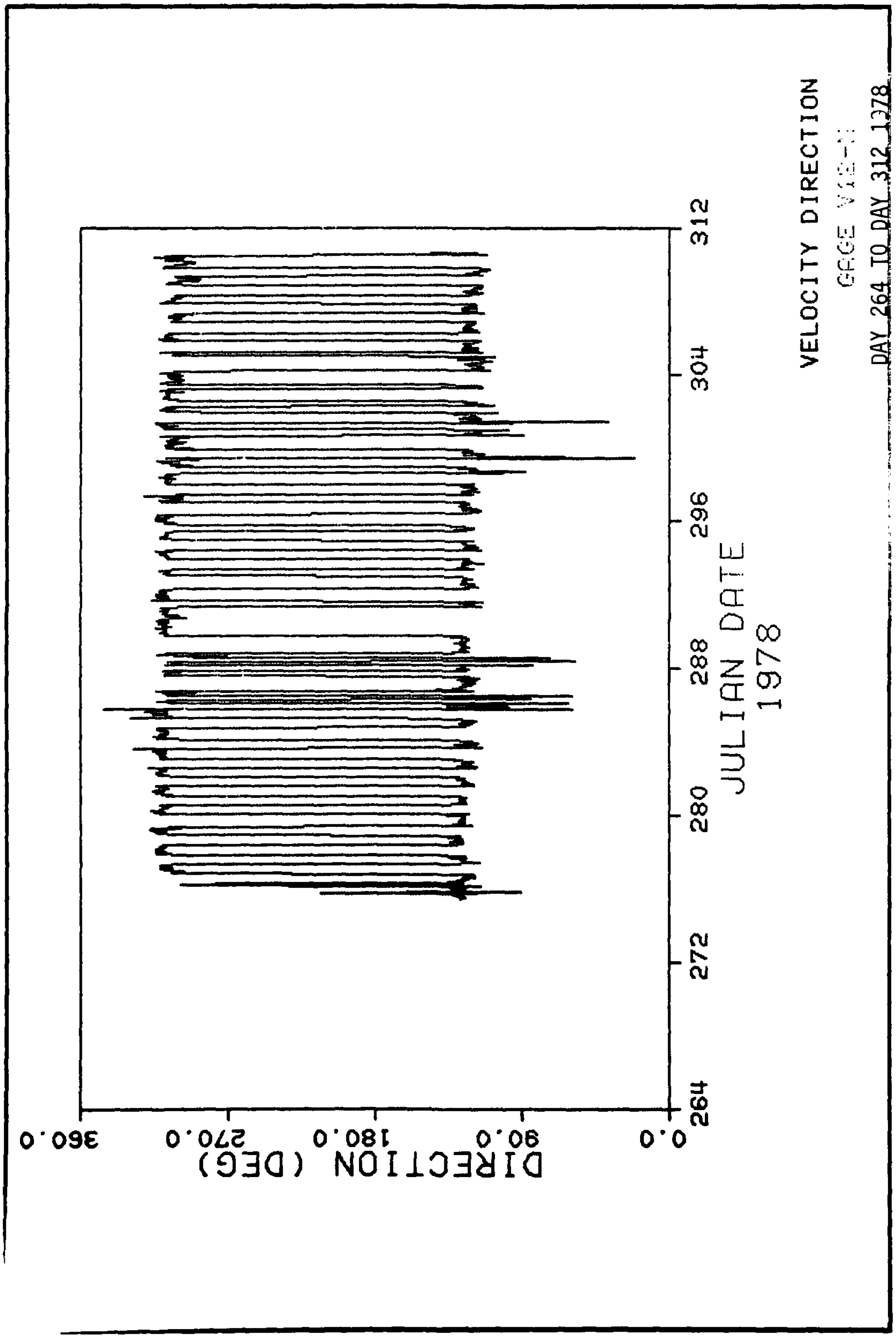

VELOCITY DIRECTION
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
264
272
280
288
296
304
312

PLATE 187

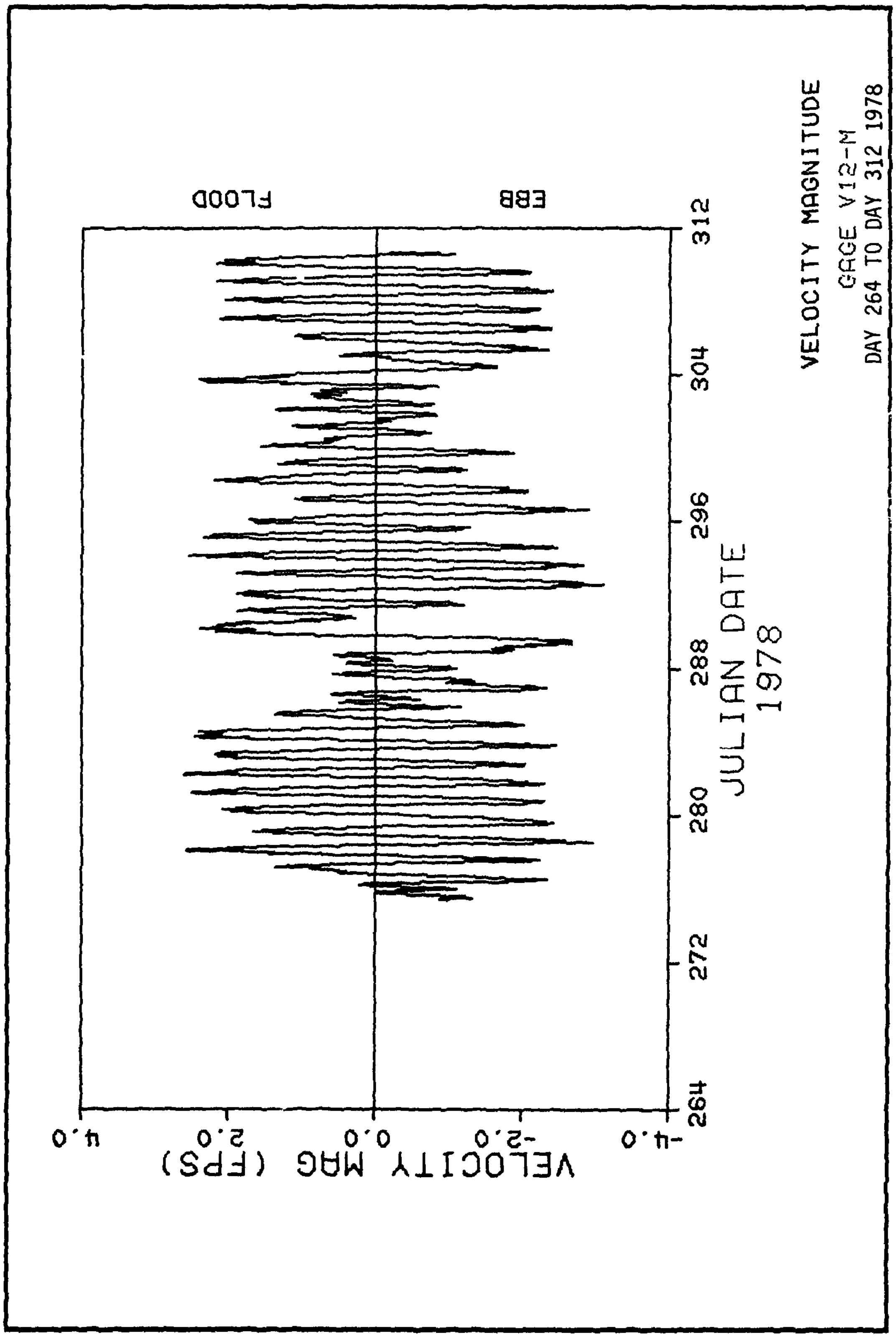

VELOCITY MAGNITUDE
GAGE V12-M
DAY 264 TO DAY 312 1978
FLOOD
EBB
264
272
280
288
296
304
312
JULIAN DATE
1978
4.0
2.0
0.0
-2.0
-4.0
VELOCITY MAG (FPS)

PLATE 188

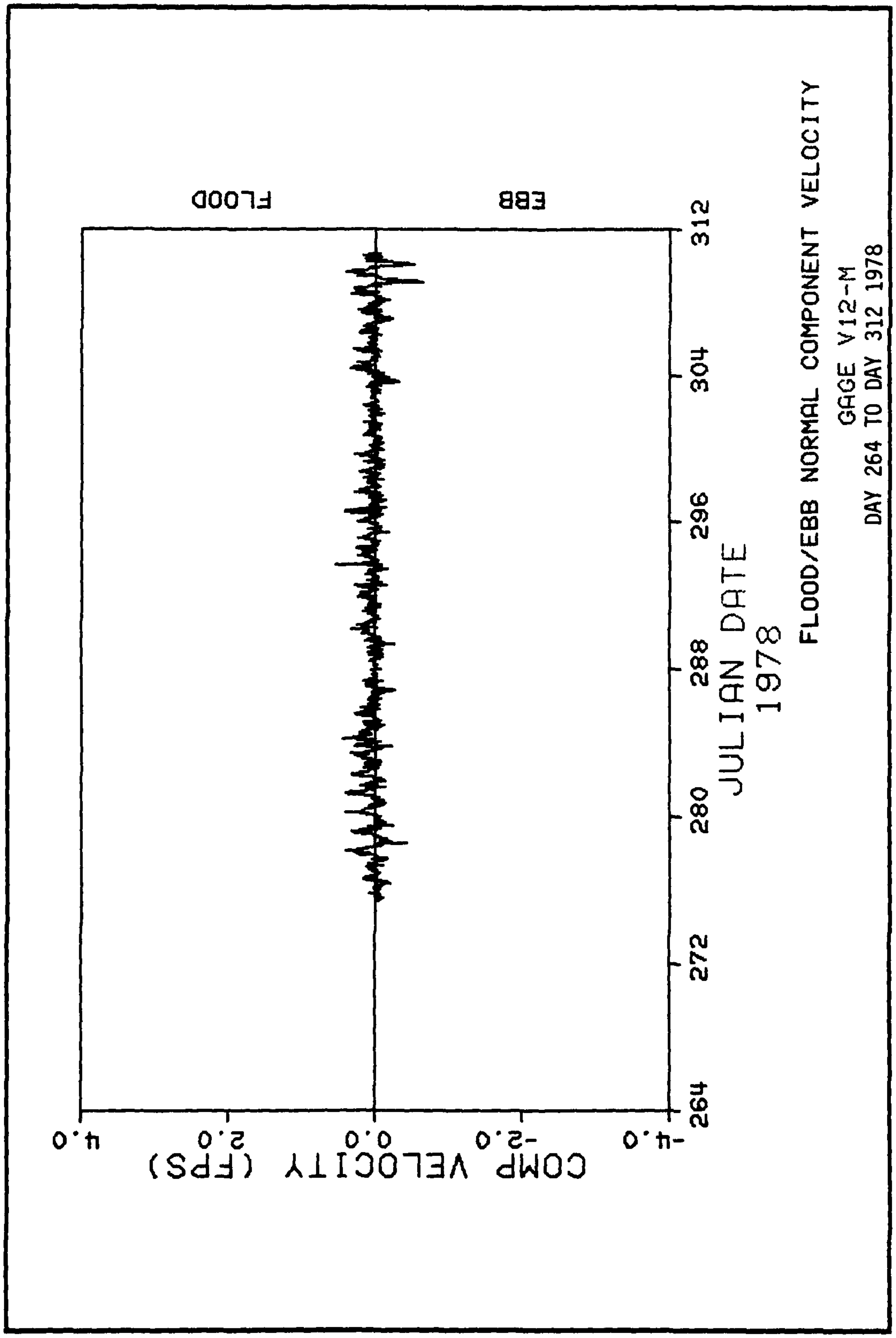

FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V12-M
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
264
272
280
288
296
304
312
COMP VELOCITY (FPS)
-4.0
-2.0
0.0
2.0
4.0
FLOOD
EBB

PLATE 189

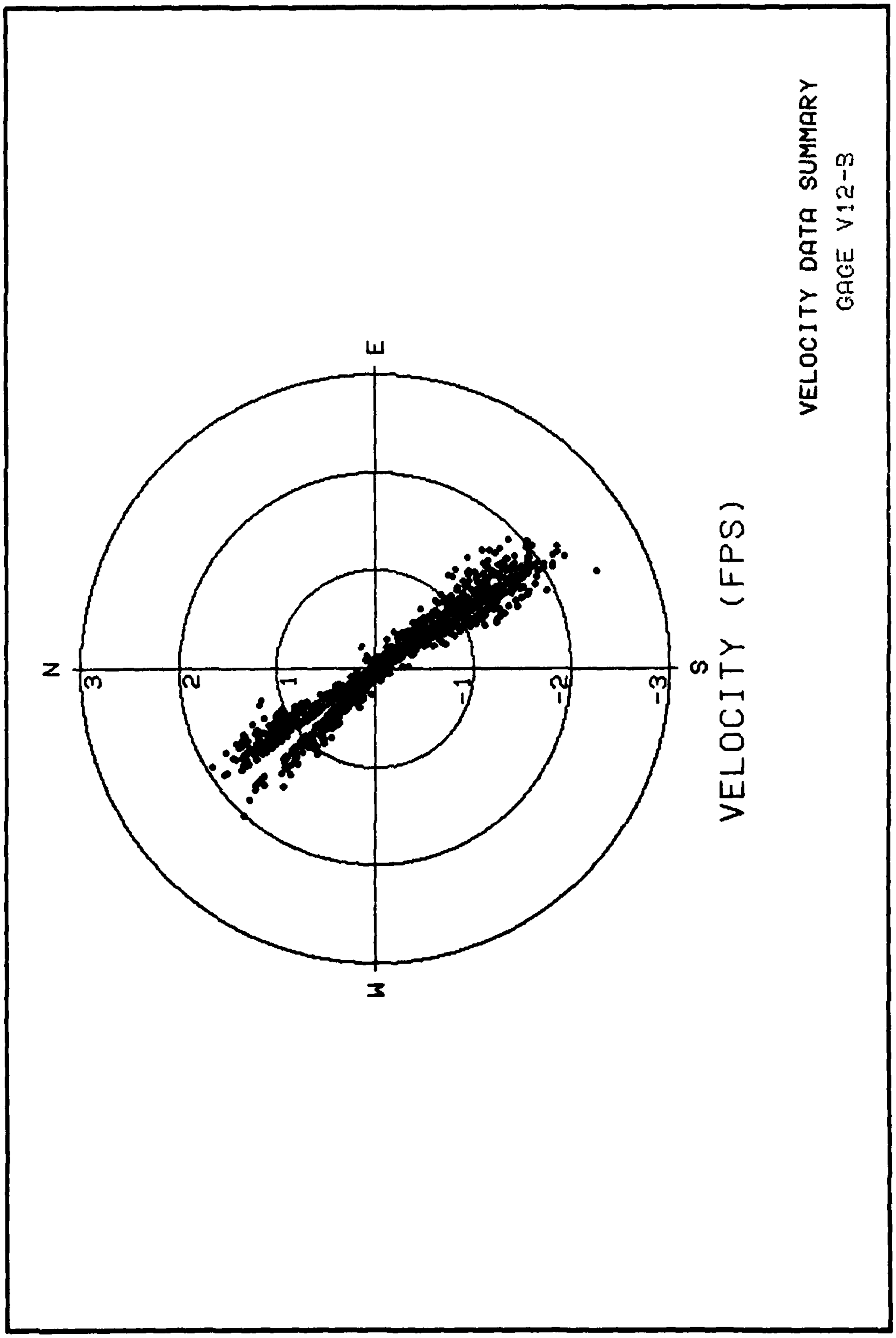
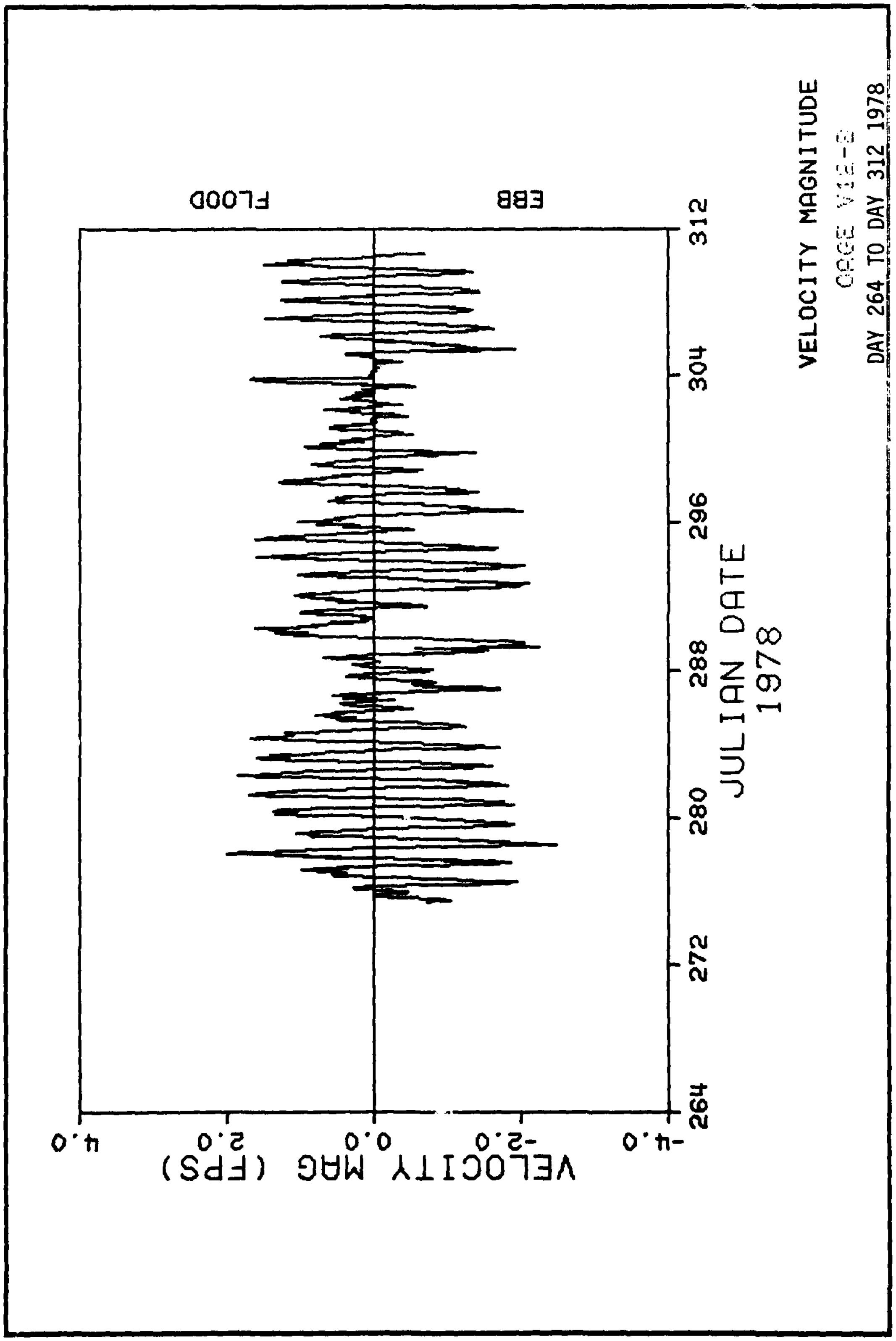


PLATE 190


VELOCITY MAGNITUDE
DAY 264 TO DAY 312 1978
FLOOD
EBB
JULIAN DATE
1978
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
264
272
280
288
296
304
312

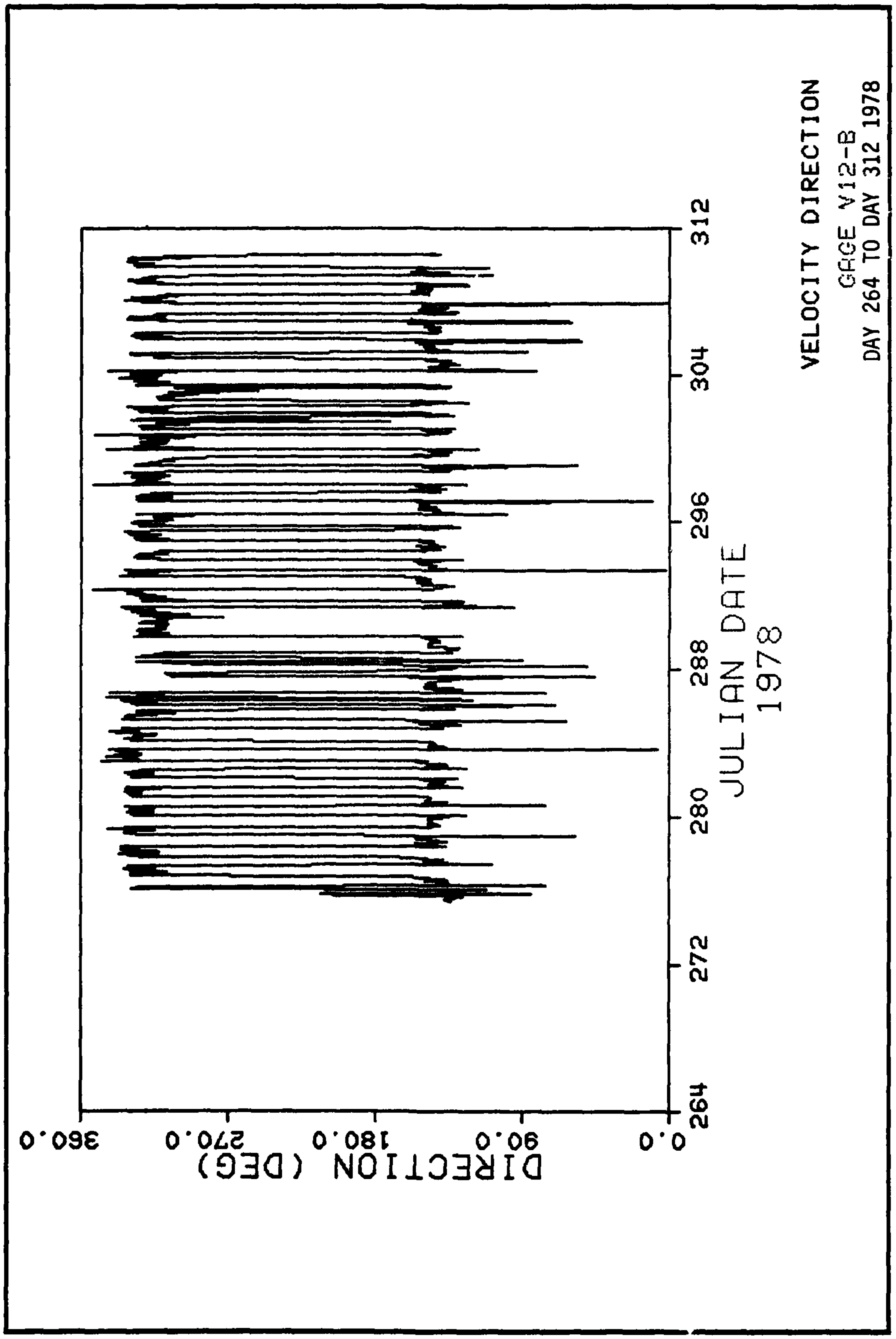
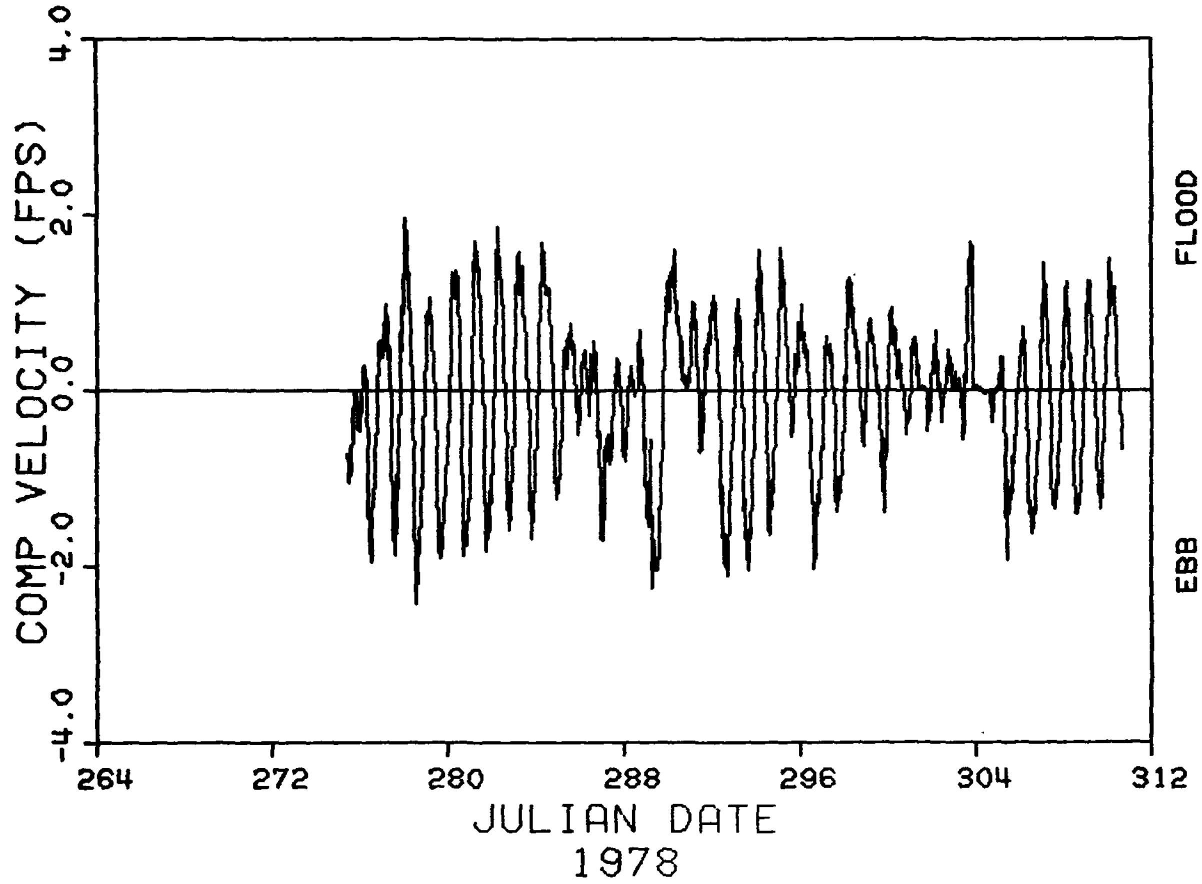

VELOCITY DIRECTION
GAGE V12-B
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
264
272
280
288
296
304
312
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0

PLATE 192



FLOOD/EBB COMPONENT VELOCITY
GAGE V12-B
DAY 264 TO DAY 312 1978

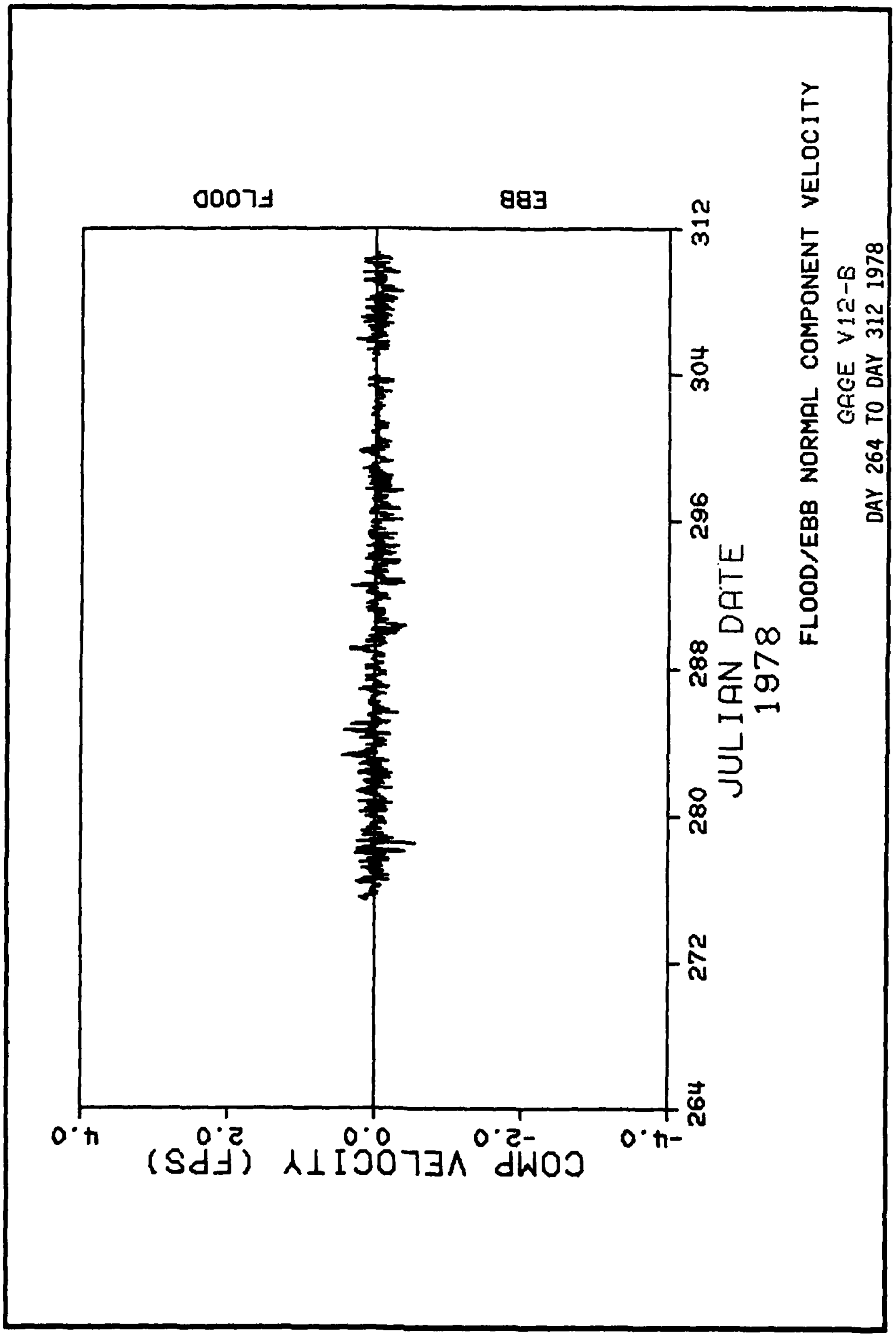
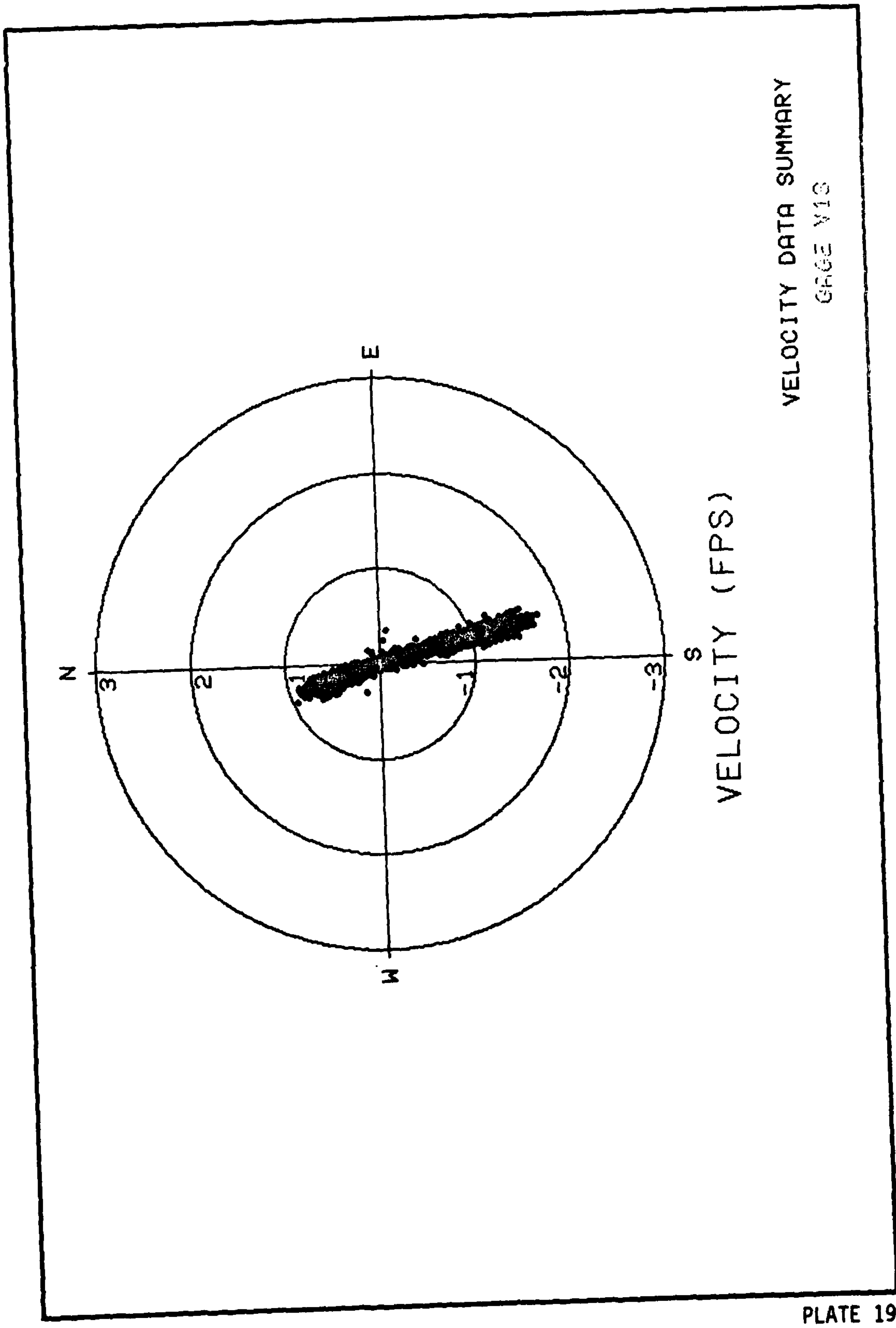
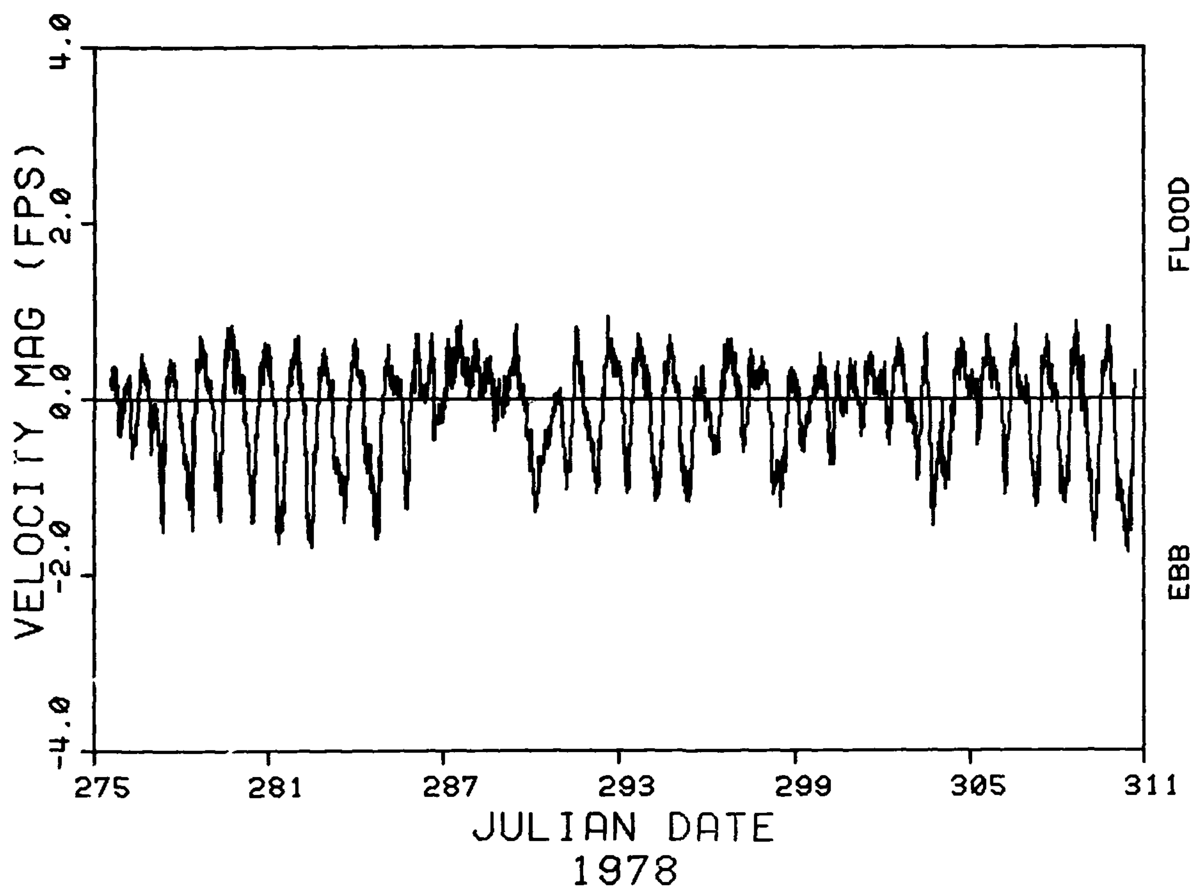

FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE V12-B
DAY 264 TO DAY 312 1978
JULIAN DATE
1978
COMP VELOCITY (FPS)
FLOOD
EBB
264
272
280
288
296
304
312
4.0
2.0
0.0
-2.0
-4.0

PLATE 194


VELOCITY DATA SUMMARY
GAGE V13
VELOCITY (FPS)
N
S
E
W
3
2
1
-1
-2
-3

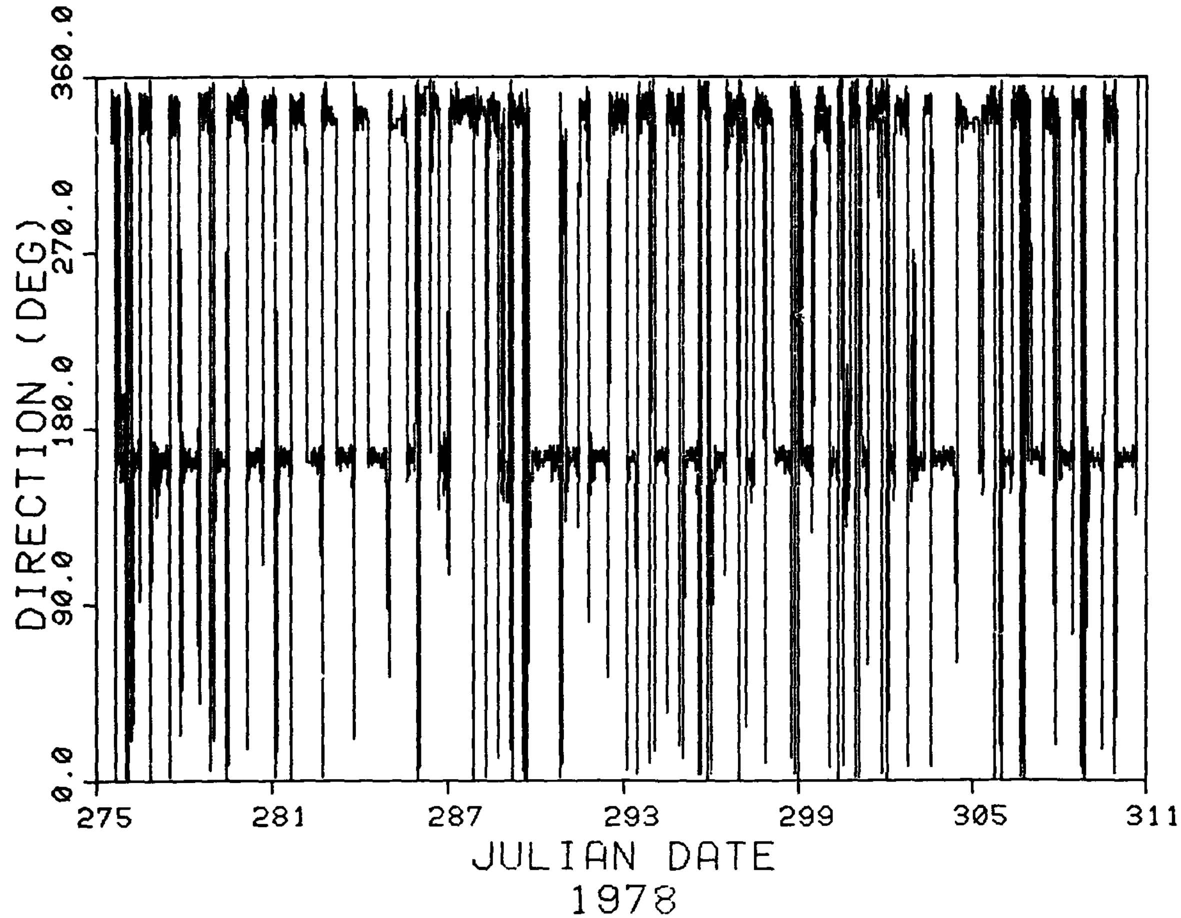


VELOCITY MAGNITUDE

GAGE V13

DAY 275 TO DAY 311 1978

PLATE 196



VELOCITY DIRECTION

GAGE V13

DAY 275 TO DAY 311 1978

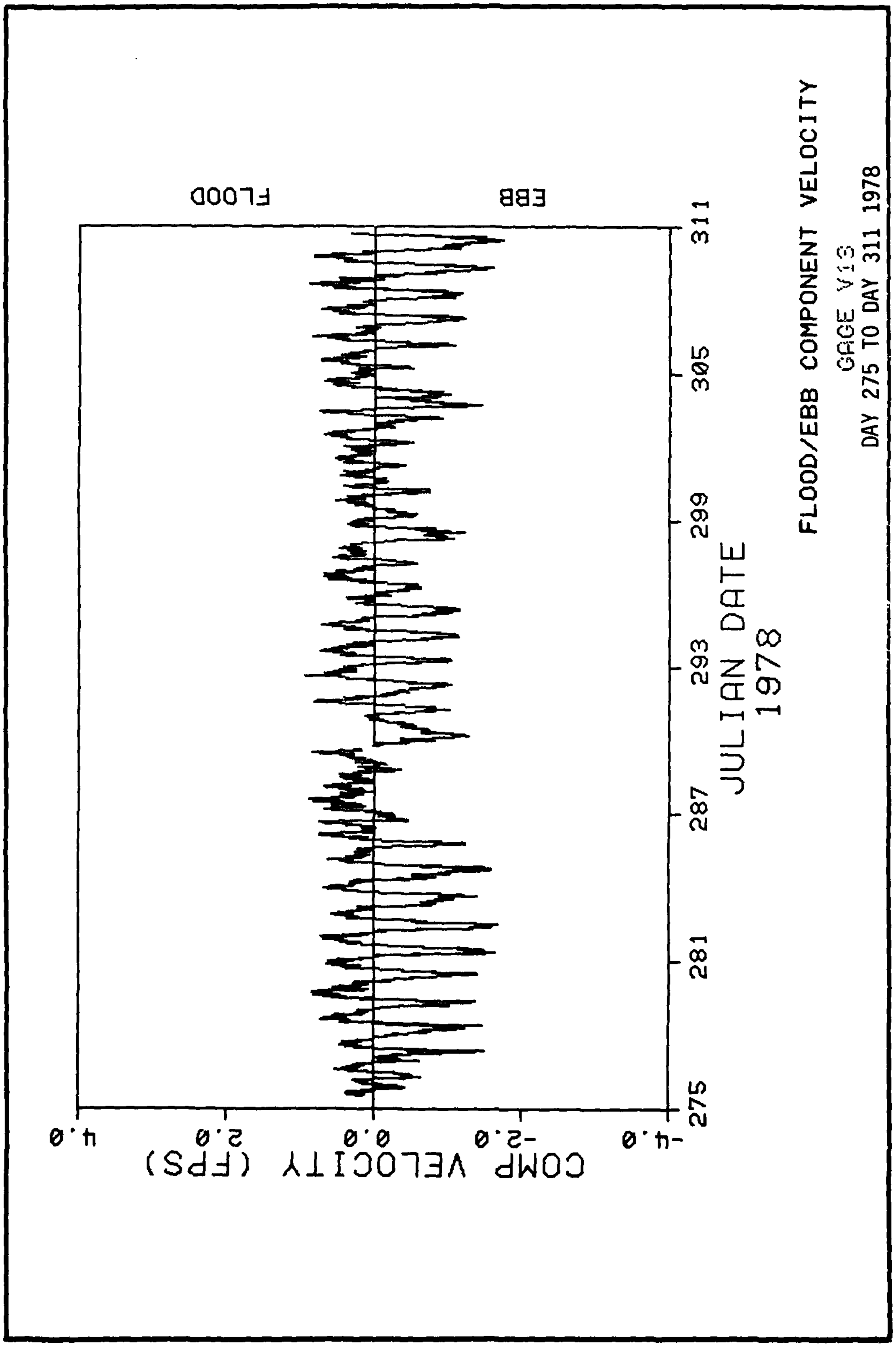
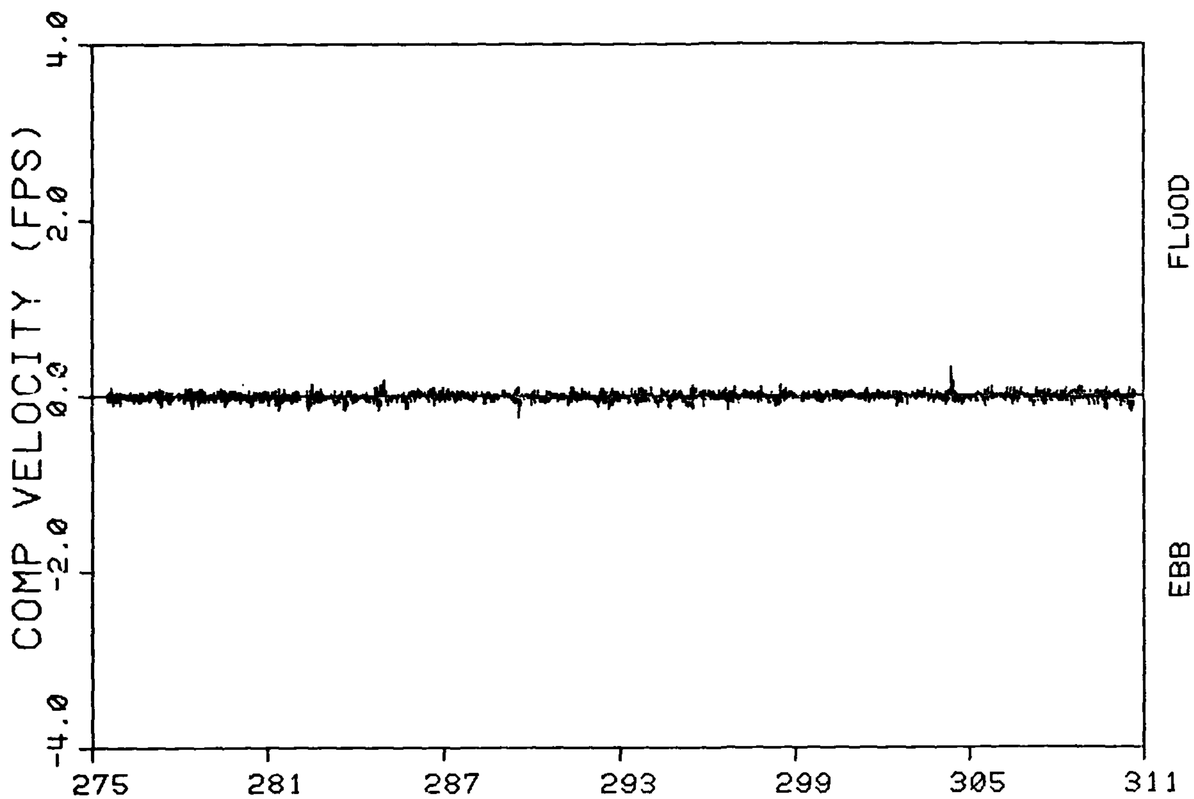

FLOOD/EBB COMPONENT VELOCITY
GAGE V13
DAY 275 TO DAY 311 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
275
281
287
293
299
305
311
JULIAN DATE
1978

PLATE 198



FLOOD/EBB NORMAL COMPONENT VELOCITY

GAGE V18

DAY 275 TO DAY 311 1978

VELOCITY DATA SUMMARY

GAGE V21-S

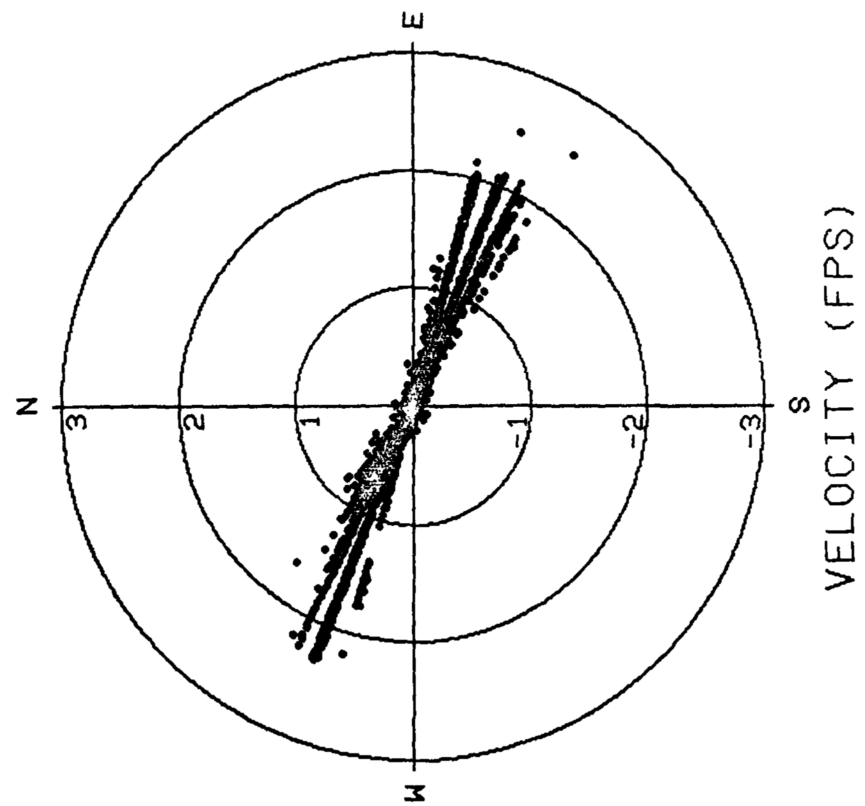


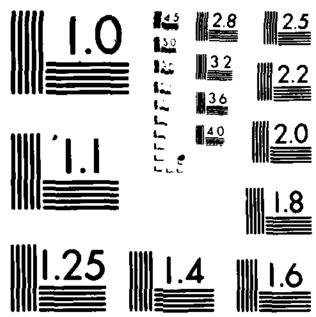
PLATE 200

AD-A112 996 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG--ETC F/G 8/8
LAKE PONTCHARTRAIN AND VICINITY HURRICANE PROTECTION PLAN. REPO--ETC(U)
JAN 82 D G OUTLAW

UNCLASSIFIED WES/TR/HL-82-2-1 NL

4 of 7

AD A



MICROCOPY RESOLUTION TEST CHART

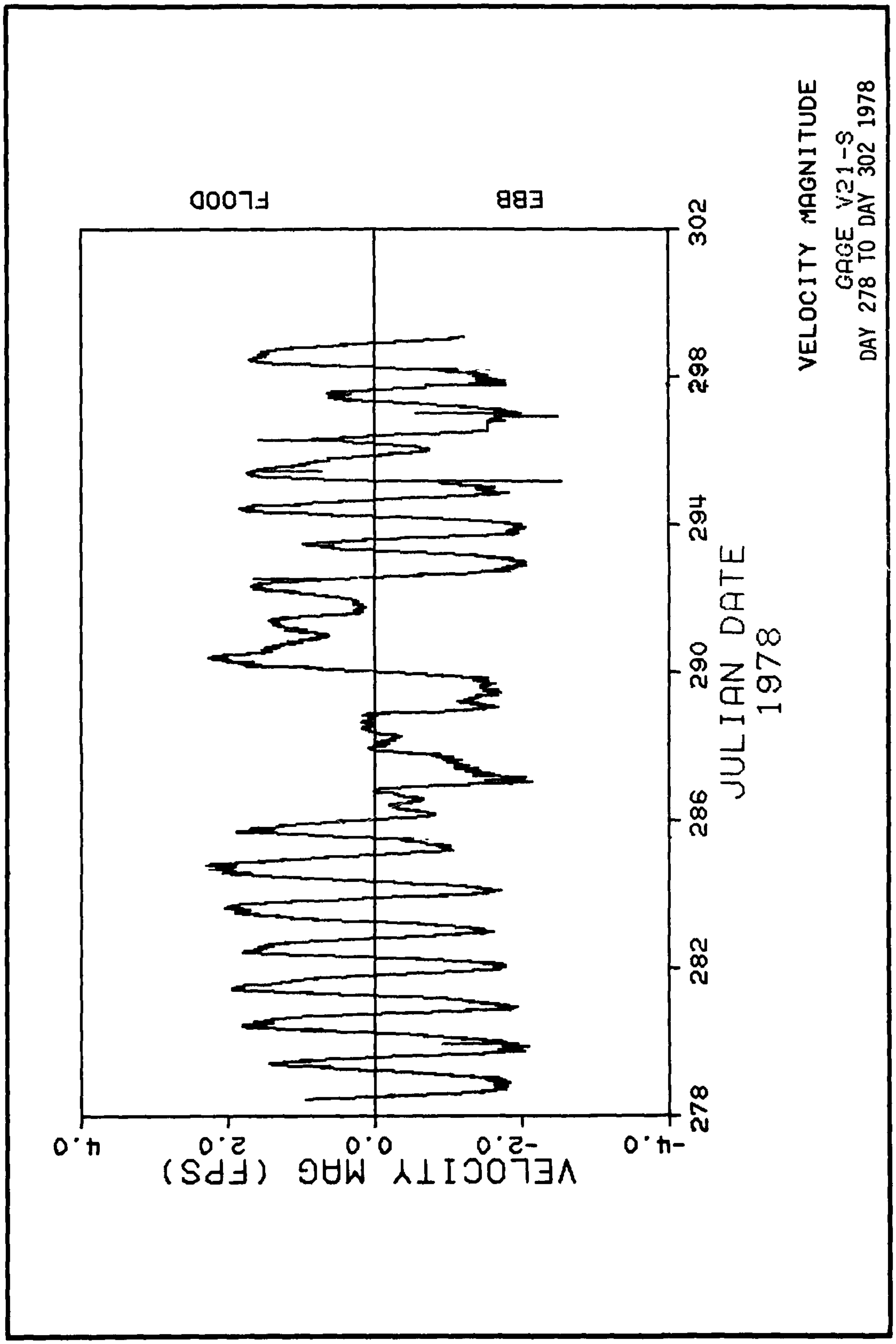

VELOCITY MAGNITUDE
GAGE V21-S
DAY 278 TO DAY 302 1978
FLOOD
EBB
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
278
282
286
290
294
298
302
JULIAN DATE
1978

PLATE 201

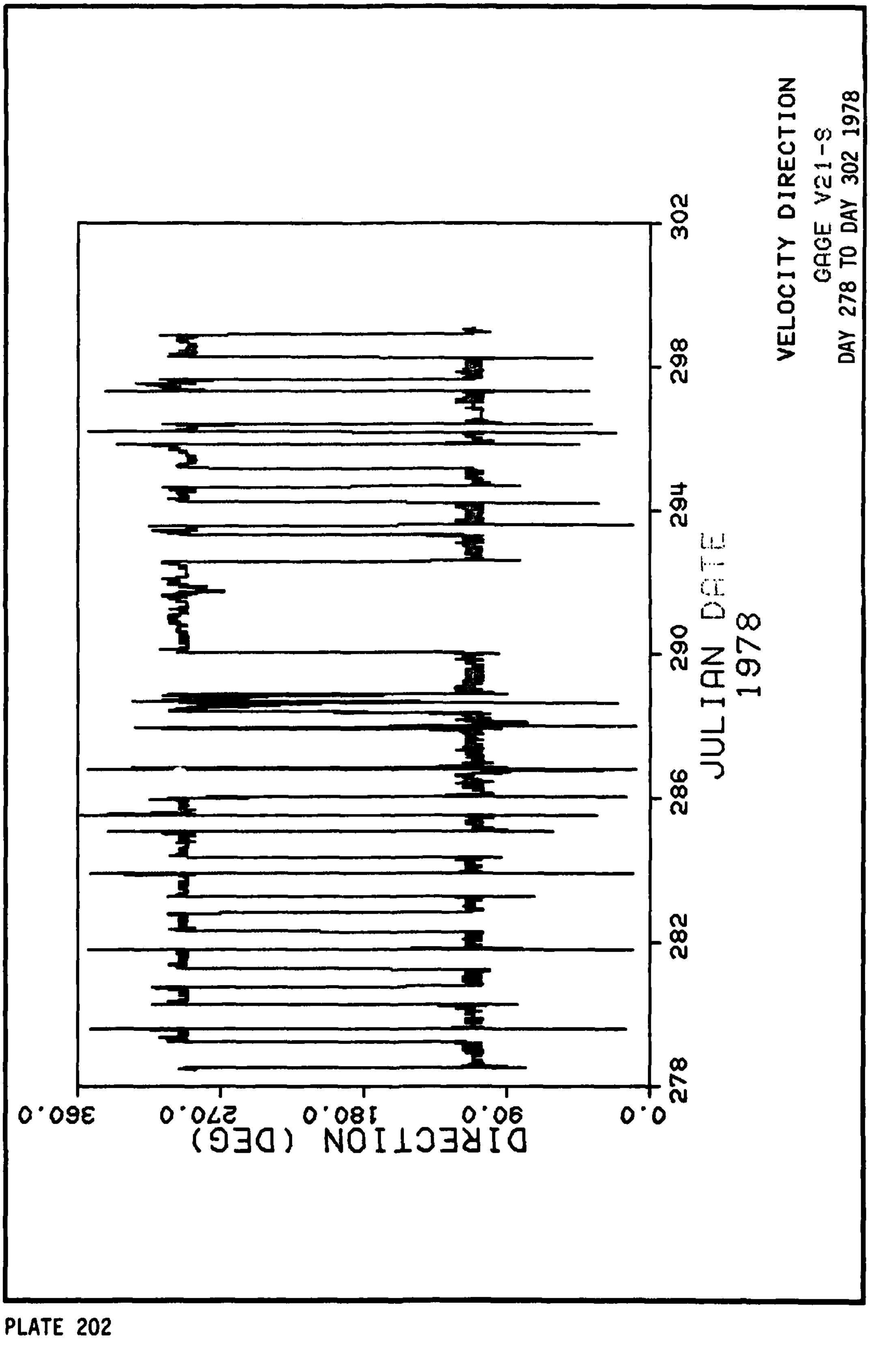

VELOCITY DIRECTION
GAGE V21-S
DAY 278 TO DAY 302 1978
DIRECTION (DEG)
0.0
90.0
180.0
270.0
360.0
JULIAN DATE
1978
278
282
286
290
294
298
302

PLATE 202

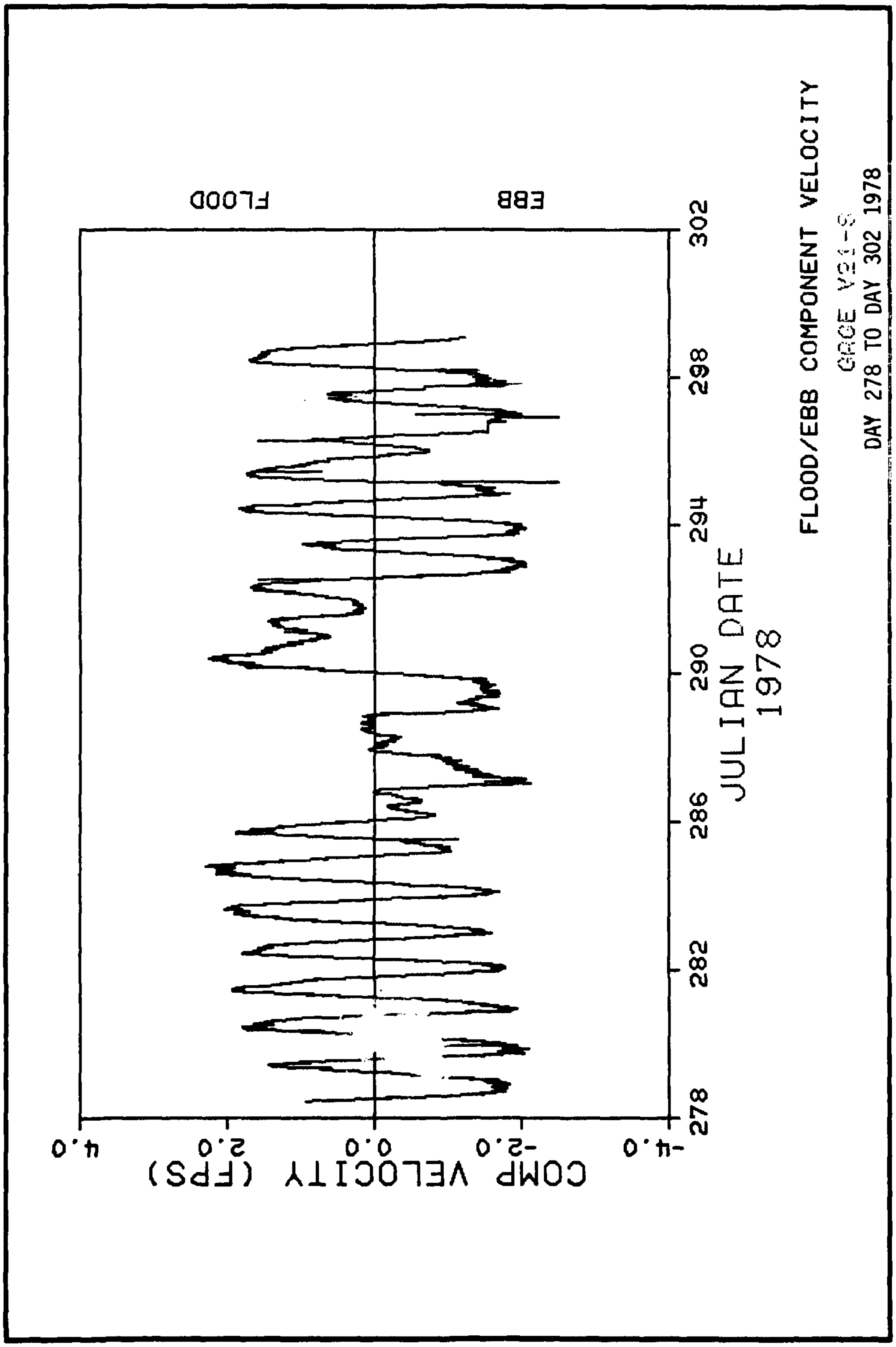

FLOOD/EBB COMPONENT VELOCITY
GAGE V21-S
DAY 278 TO DAY 302 1978
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1978
278
282
286
290
294
298
302

PLATE 203

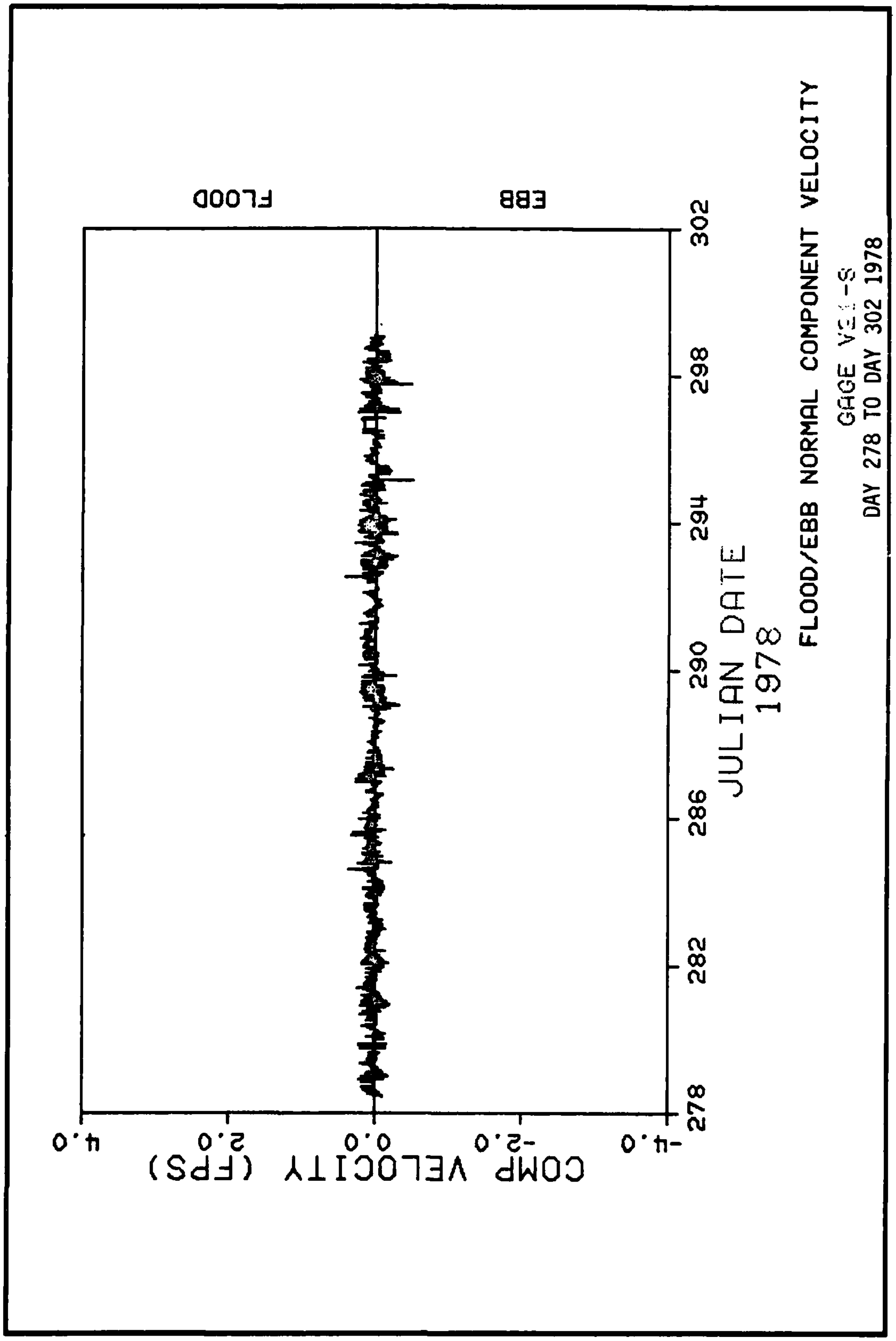
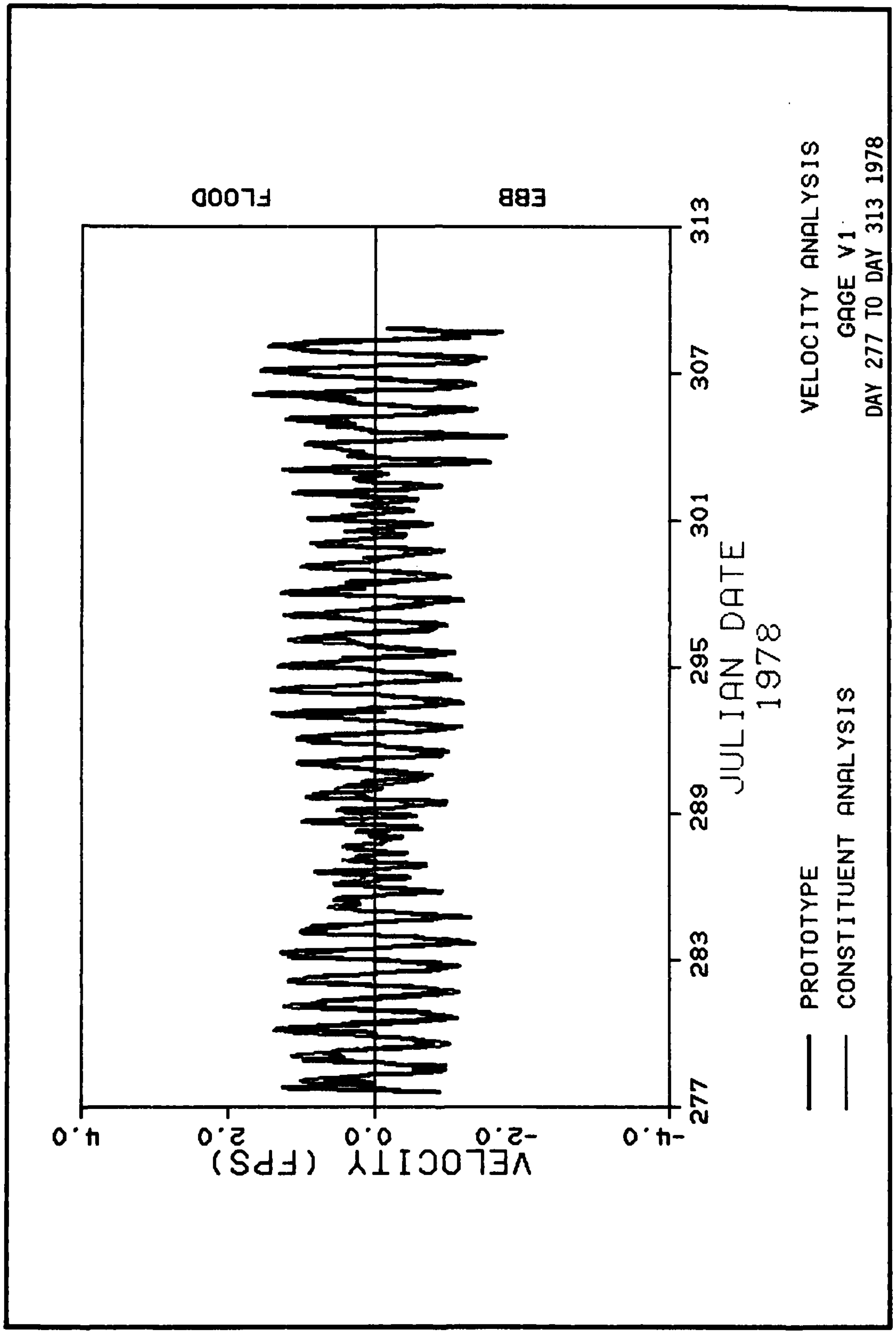

FLOOD/EBB NORMAL COMPONENT VELOCITY
DAY 278 TO DAY 302 1978
JULIAN DATE
1978
COMP VELOCITY (FPS)
FLOOD
EBB
278
282
286
290
294
298
302
-4.0
-2.0
0.0
2.0
4.0

PLATE 204



VELOCITY ANALYSIS
GAGE V1
DAY 277 TO DAY 313 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

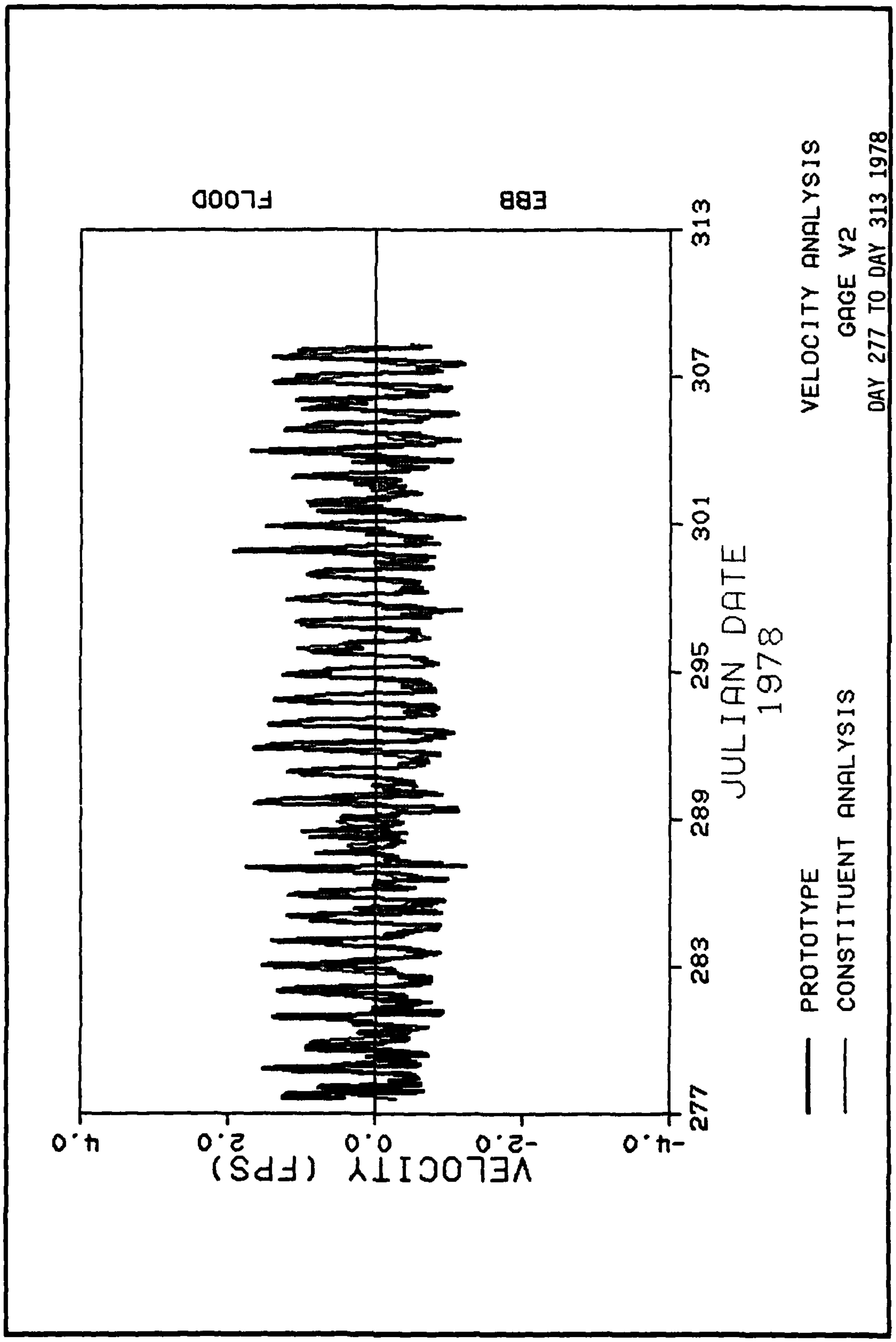

VELOCITY ANALYSIS
GAGE V2
DAY 277 TO DAY 313 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

PLATE 206

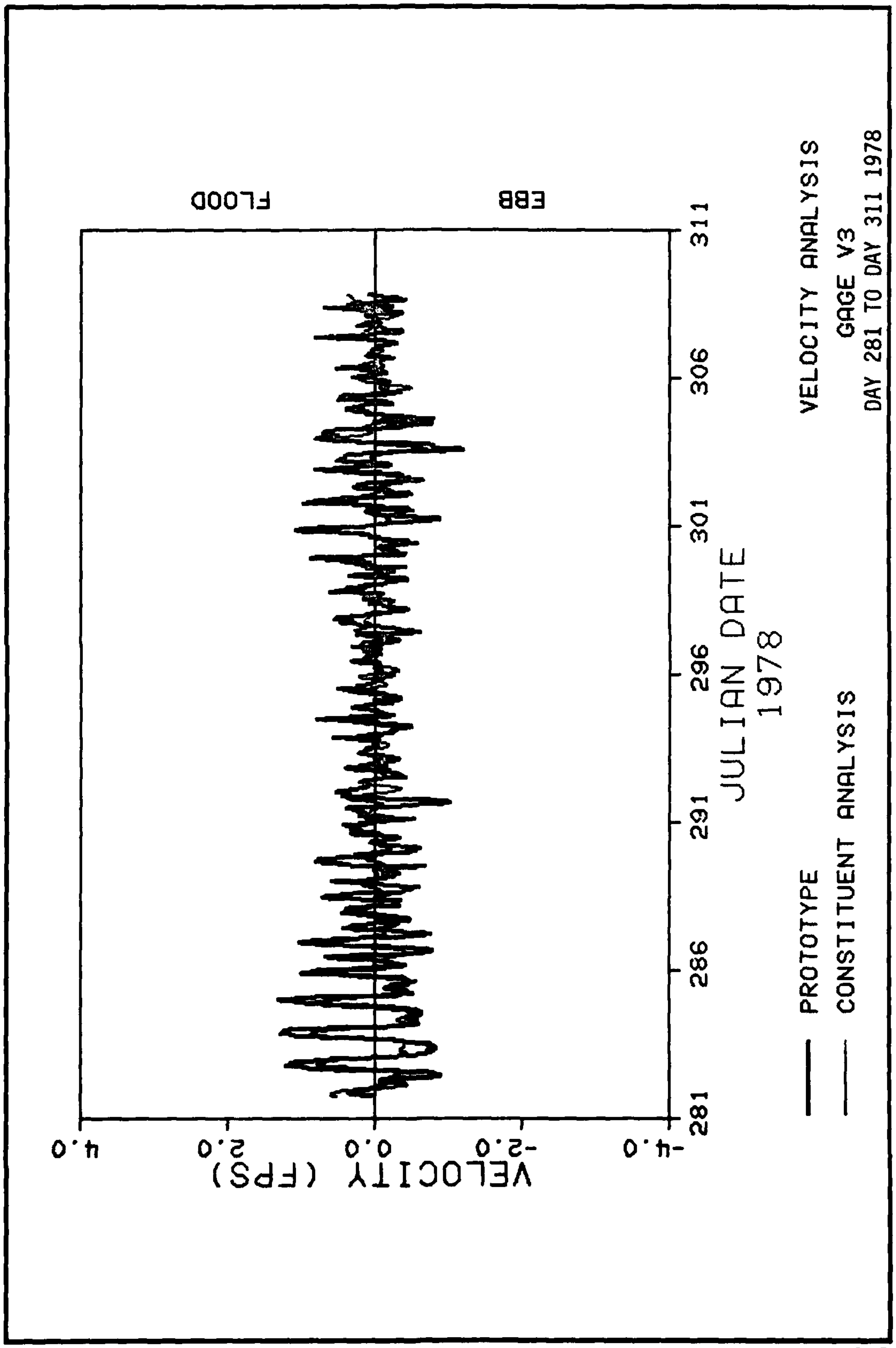

VELOCITY ANALYSIS
GAGE V3
DAY 281 TO DAY 311 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
281
286
291
296
301
306
311
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

PLATE 207

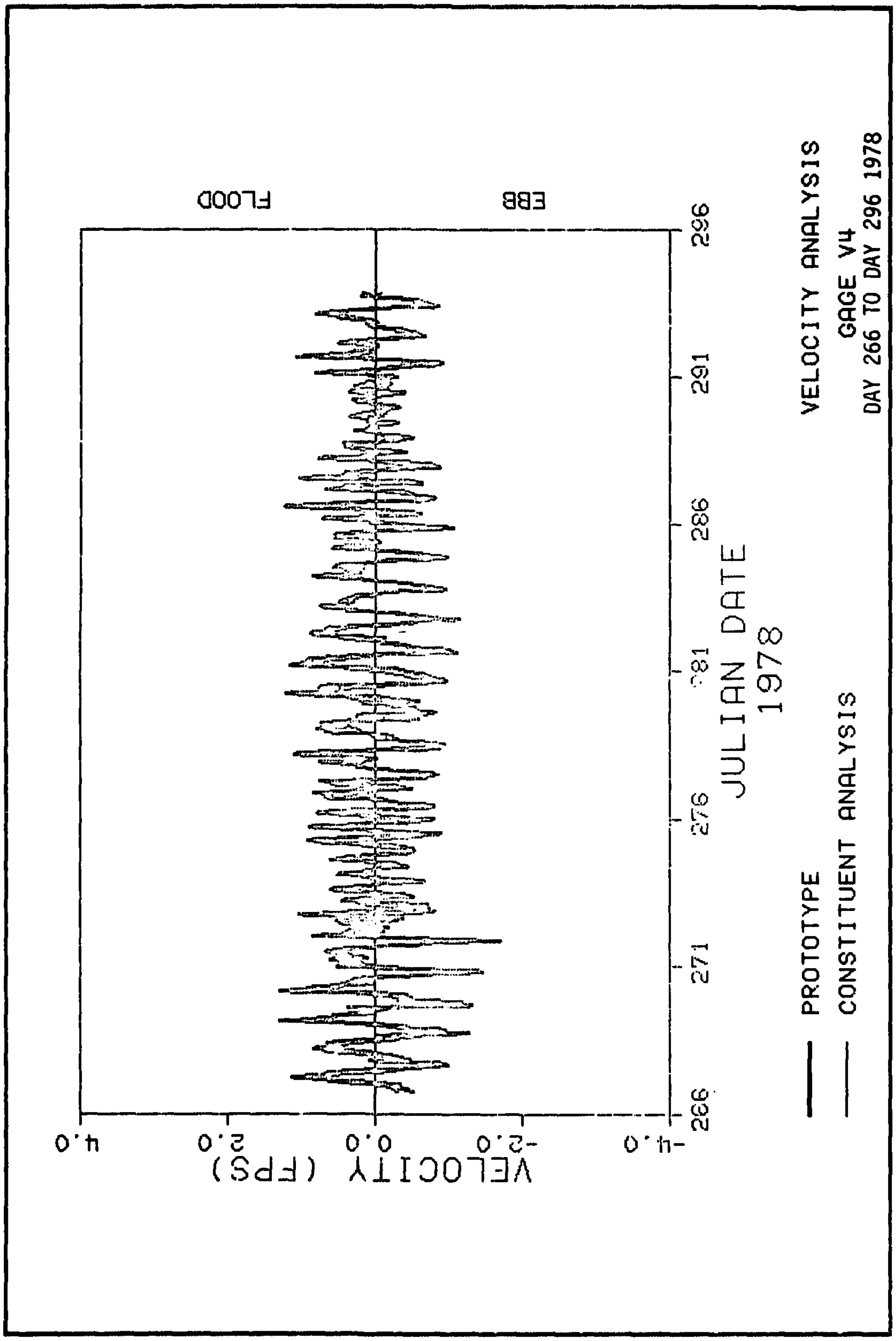
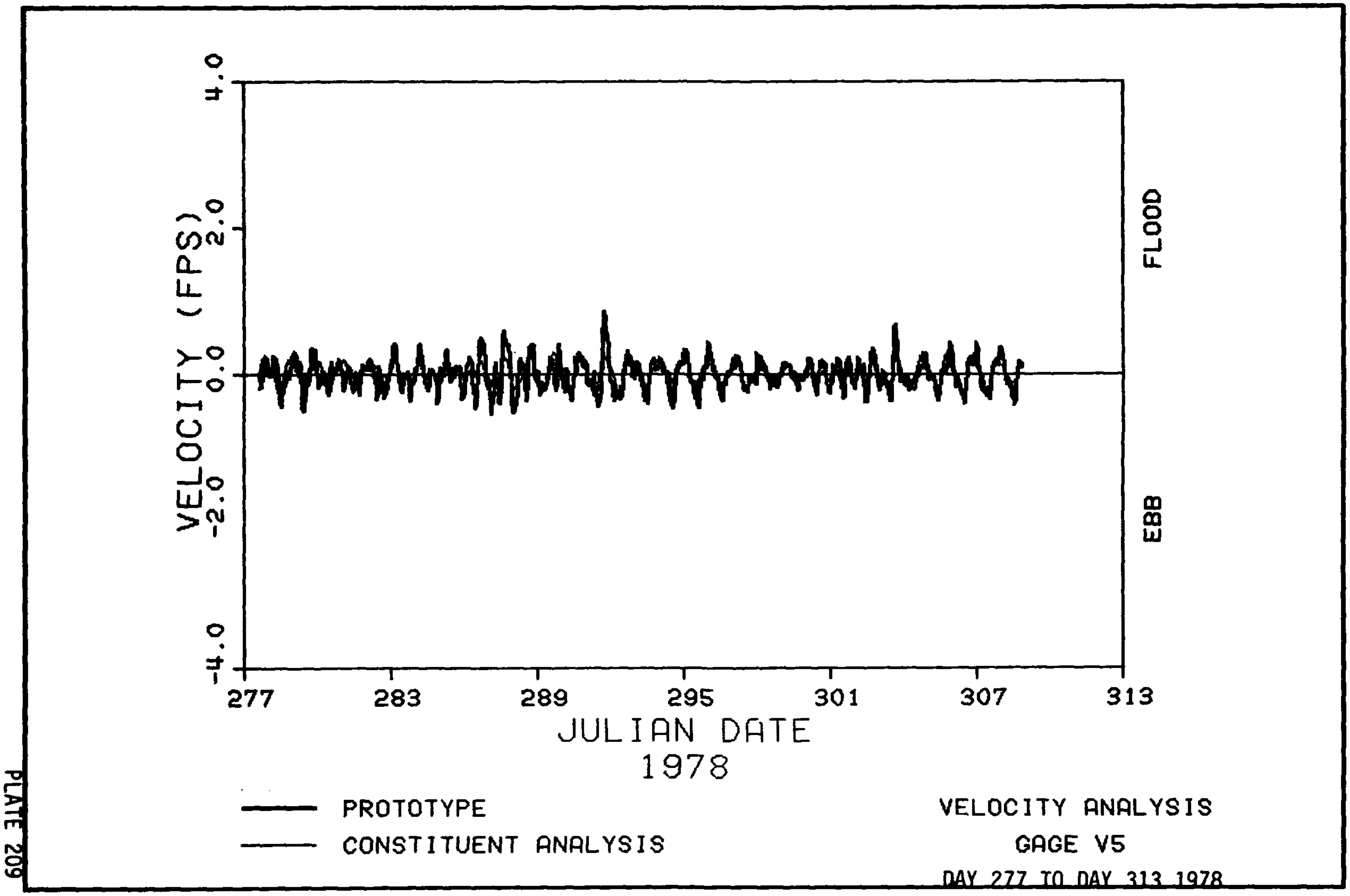

VELOCITY ANALYSIS
GAGE V4
DAY 266 TO DAY 296 1978
PROTOTYPE
CONSTITUENT ANALYSIS
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1978
266
271
276
281
286
291
296

PLATE 208


VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
FLOOD
EBB
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS
VELOCITY ANALYSIS
GAGE V5
DAY 277 TO DAY 313 1978

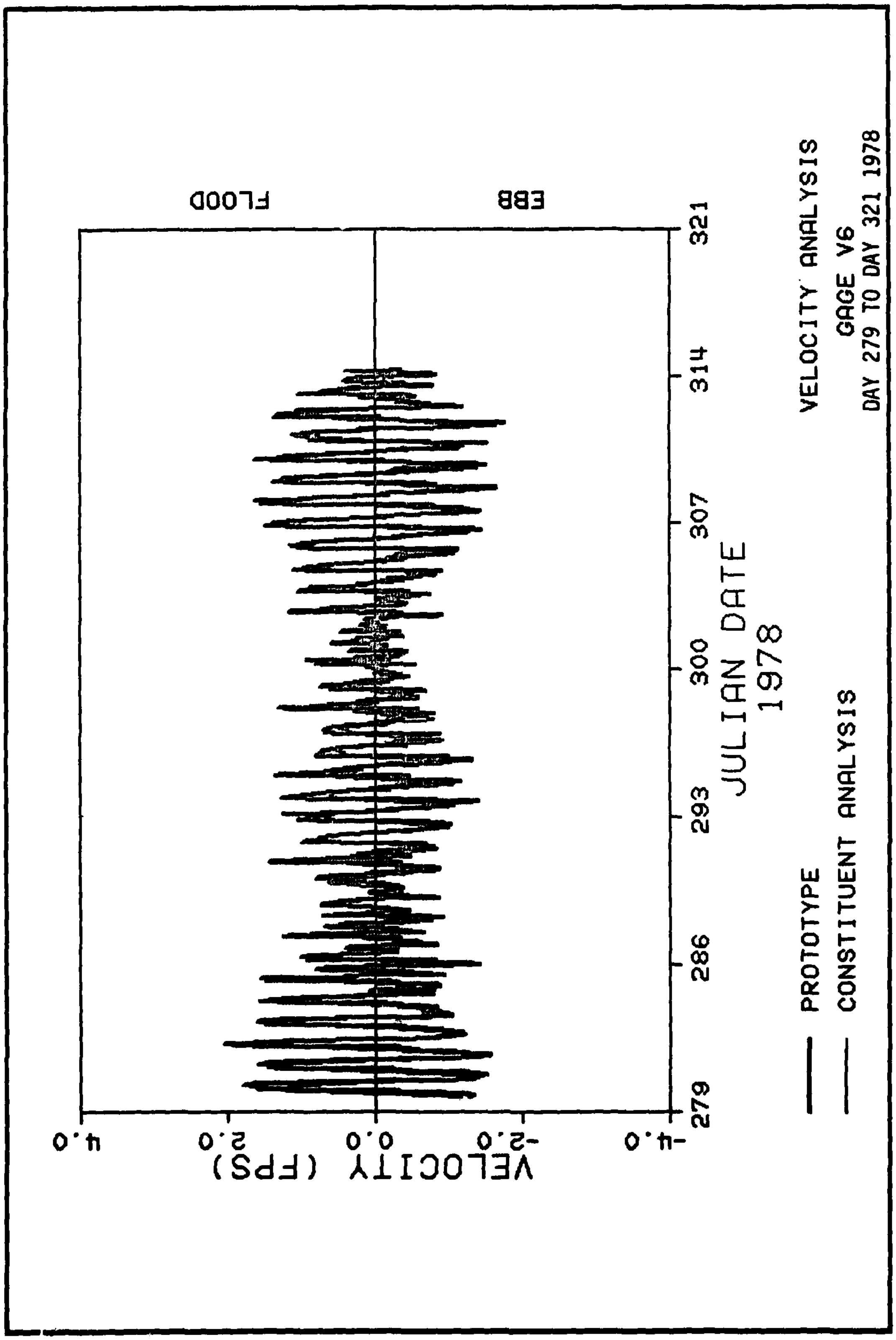
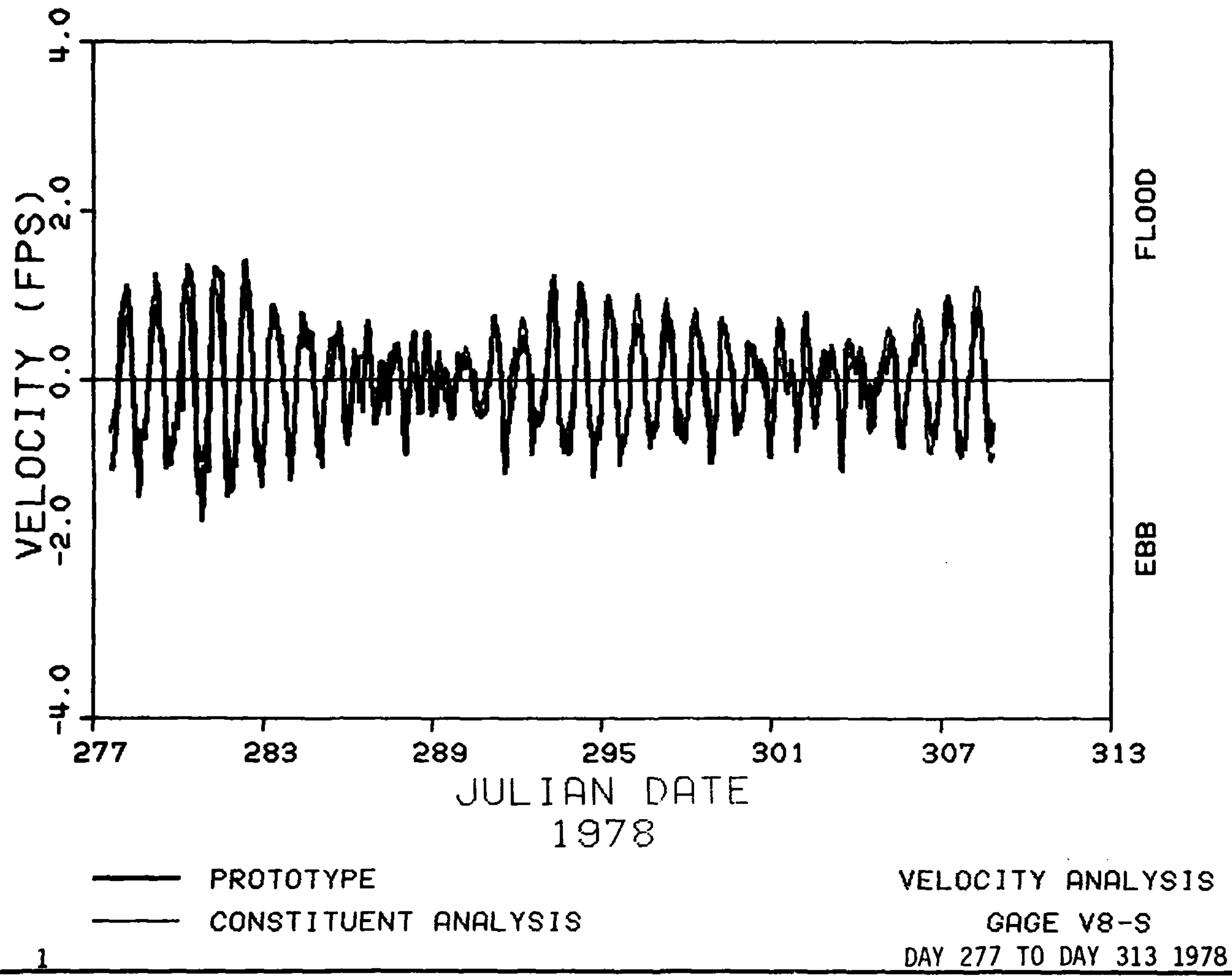

VELOCITY ANALYSIS
GAGE V6
DAY 279 TO DAY 321 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
279
286
293
300
307
314
321
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

PLATE 210


4.0
2.0
0.0
-2.0
-4.0
VELOCITY (FPS)
FLOOD
EBB
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS
VELOCITY ANALYSIS
GAGE V8-S
DAY 277 TO DAY 313 1978
1

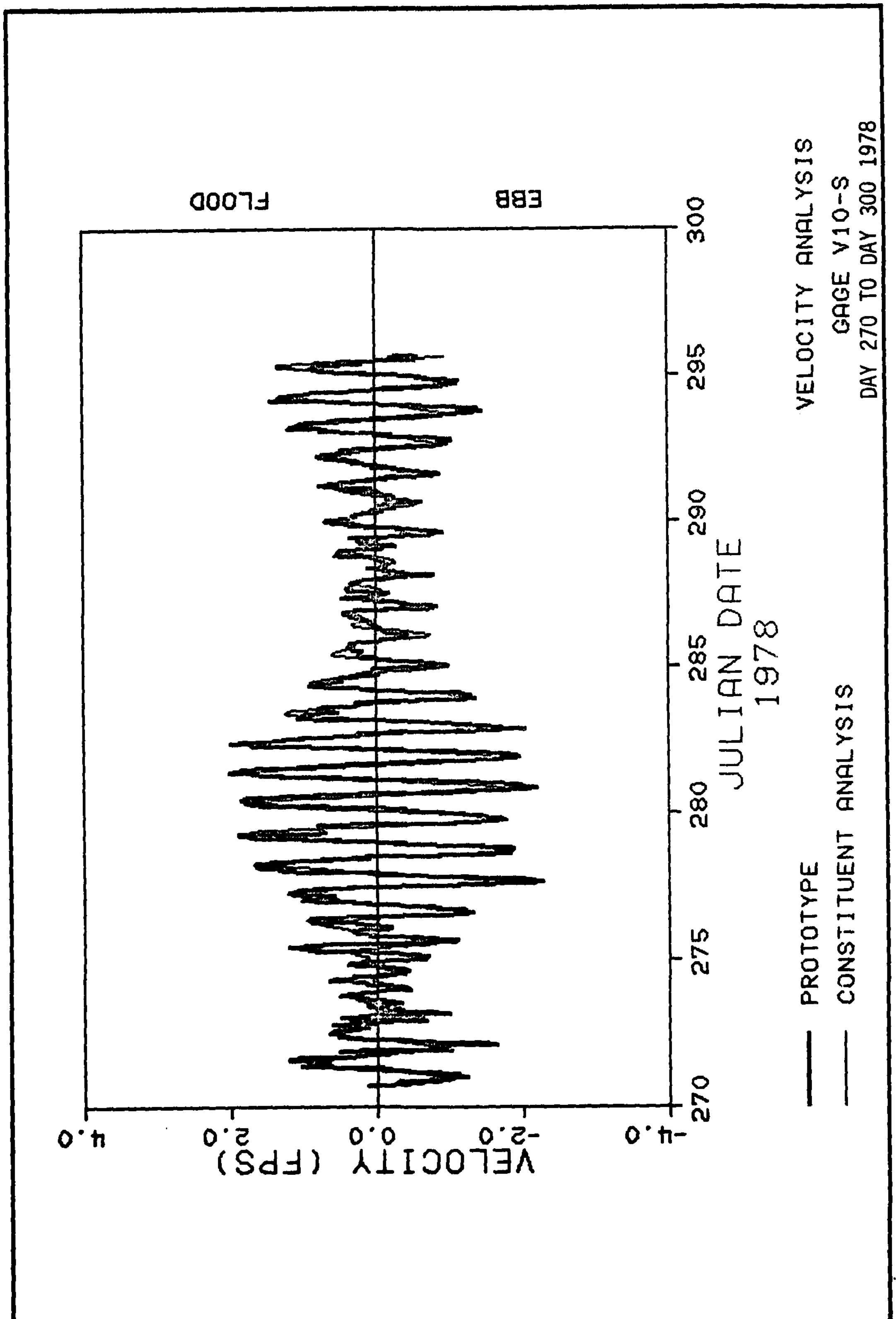
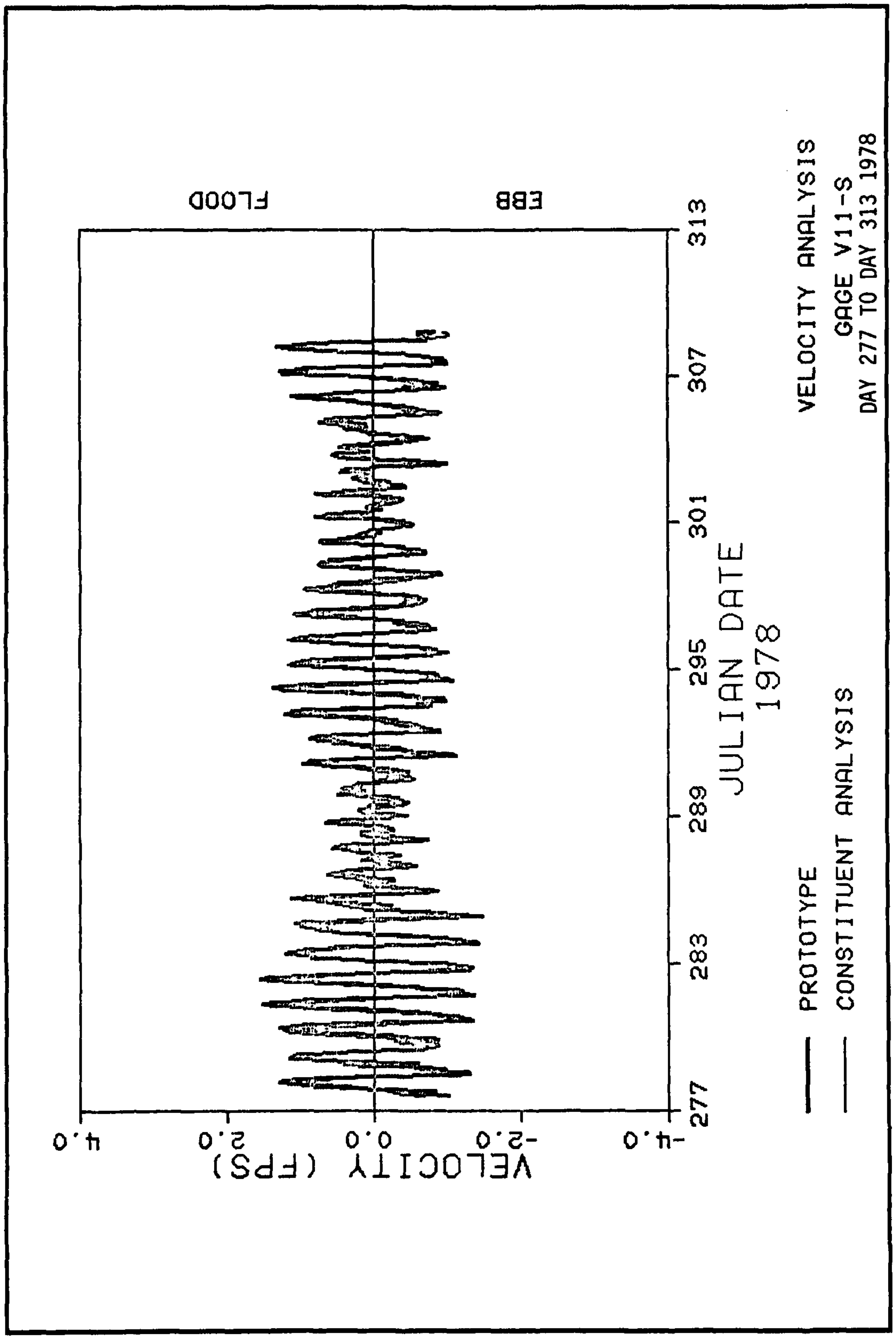

VELOCITY ANALYSIS
GAGE V10-S
DAY 270 TO DAY 300 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
270
275
280
285
290
295
300
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

PLATE 212


VELOCITY ANALYSIS
GAGE V11-S
DAY 277 TO DAY 313 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

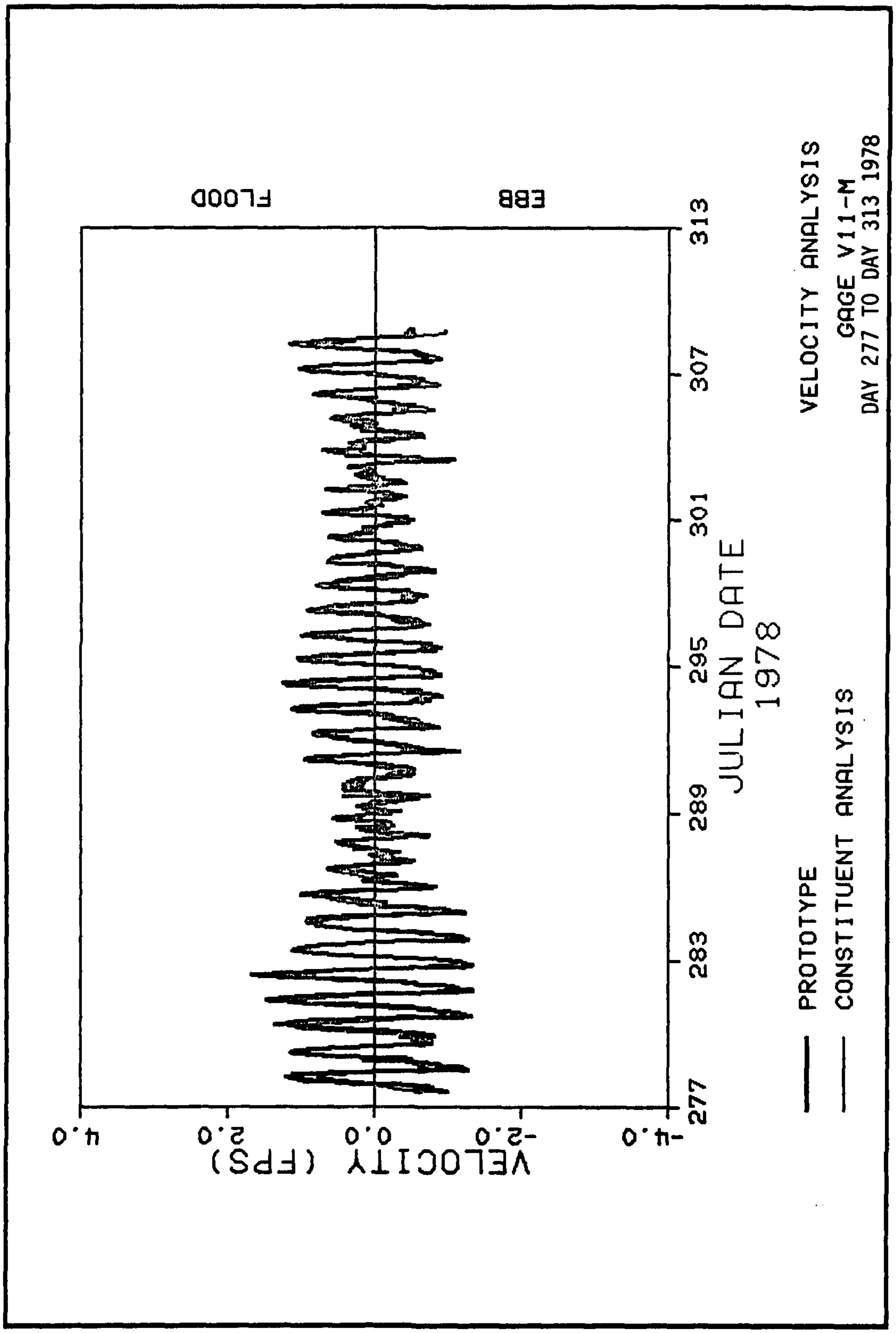
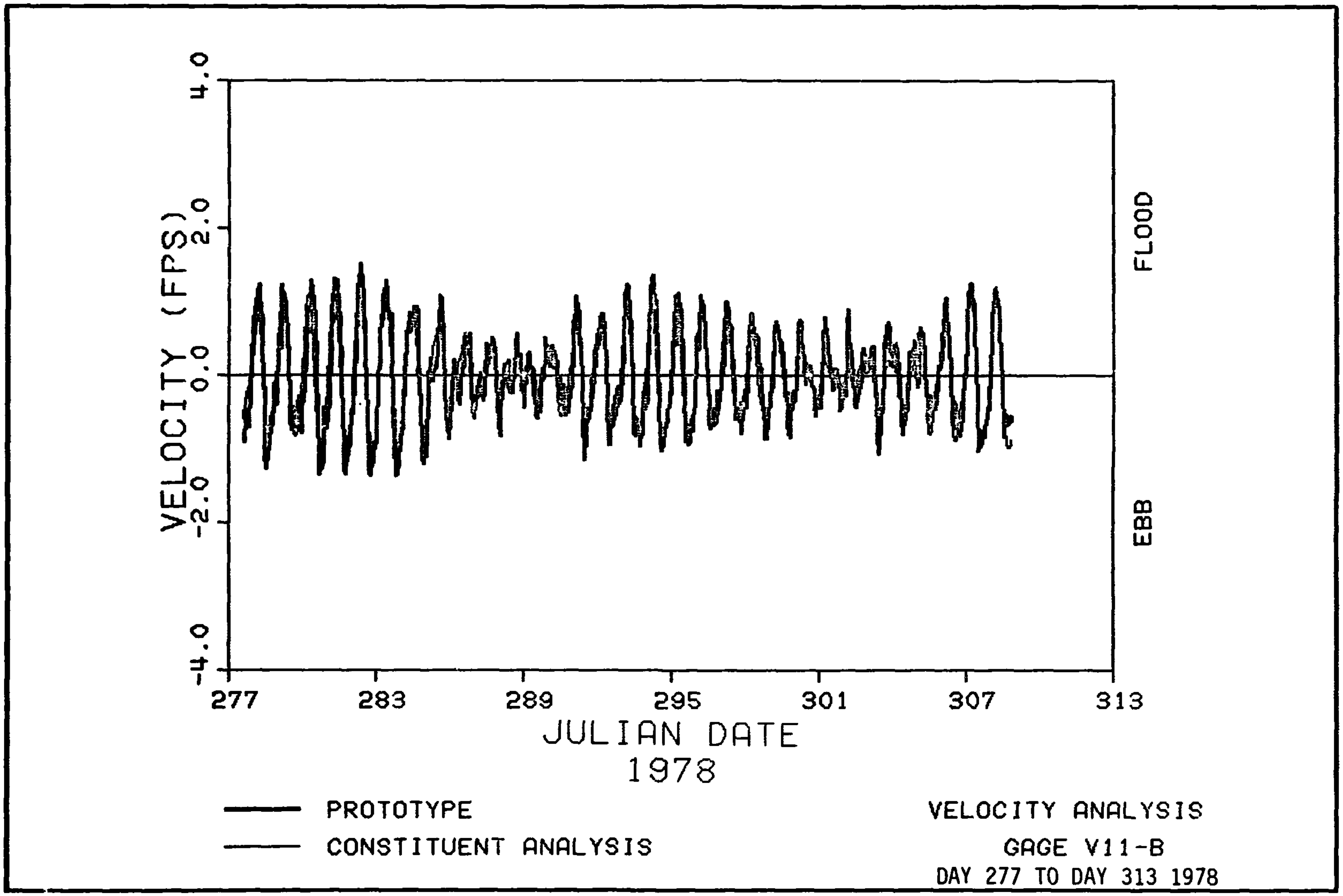

VELOCITY ANALYSIS
GAGE V11-M
DAY 277 TO DAY 313 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

PLATE 214


VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
FLOOD
EBB
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS
VELOCITY ANALYSIS
GAGE V11-B
DAY 277 TO DAY 313 1978

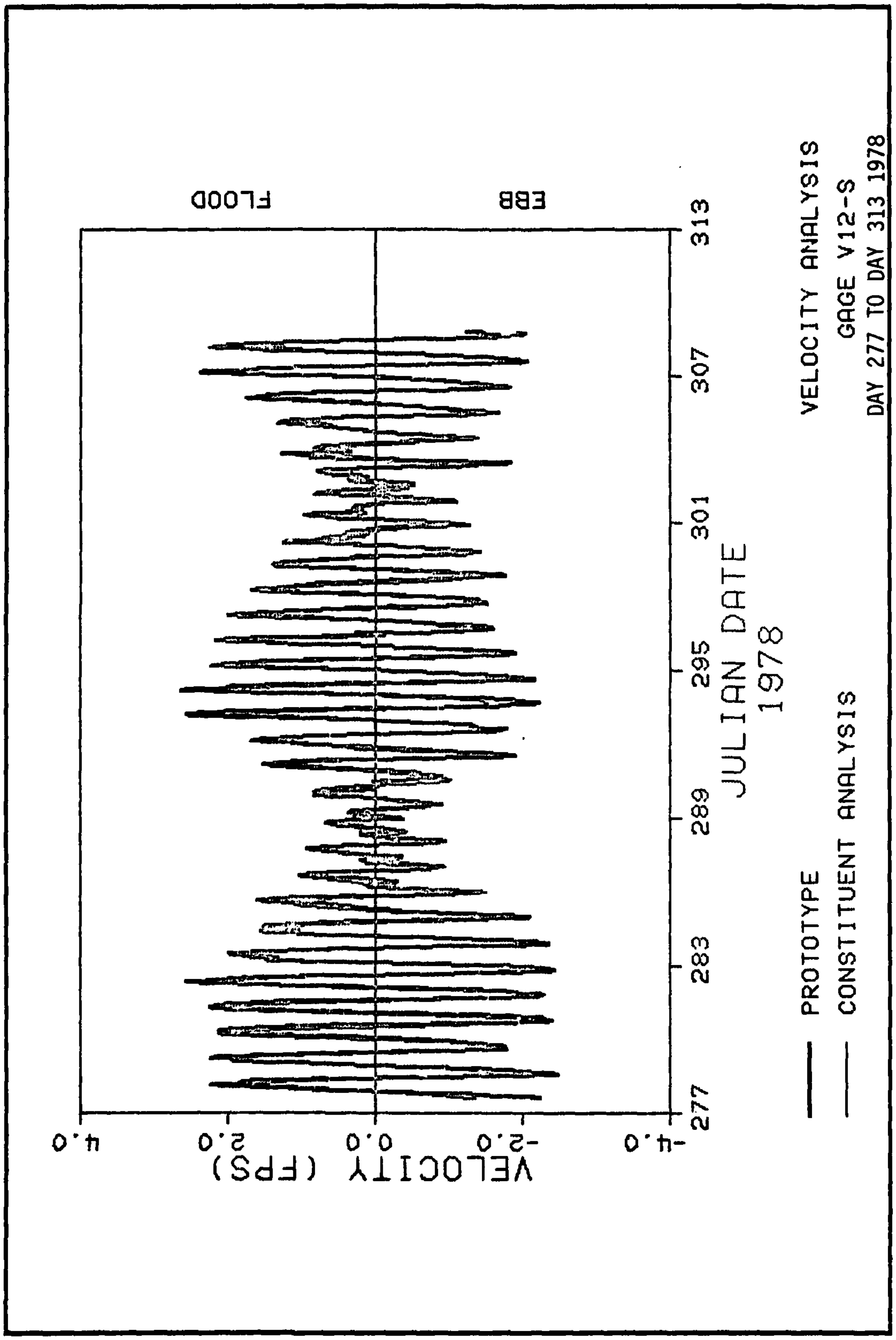

VELOCITY ANALYSIS
GAGE V12-S
DAY 277 TO DAY 313 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

PLATE 216

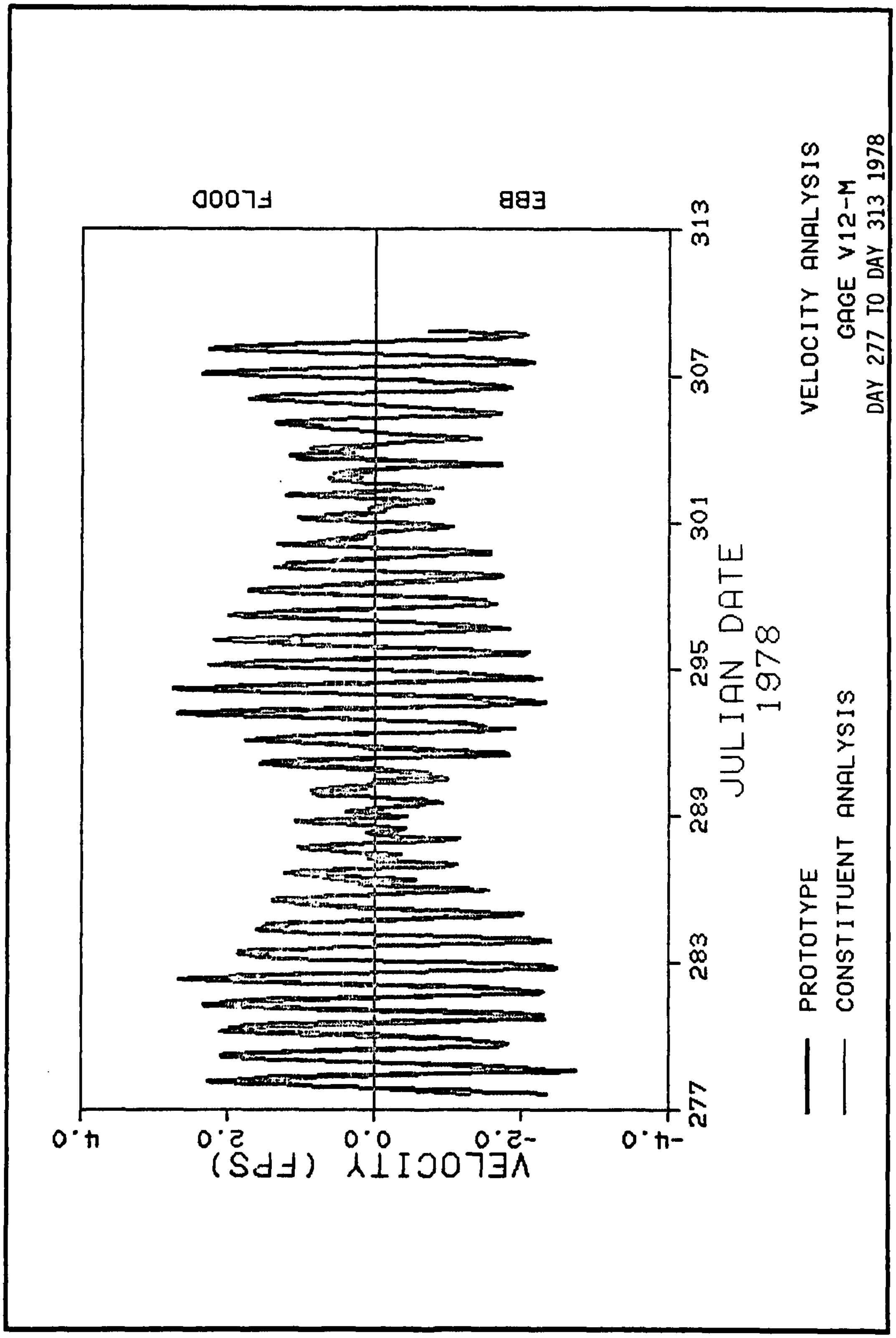

VELOCITY ANALYSIS
GAGE V12-M
DAY 277 TO DAY 313 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
277
283
289
295
301
307
313
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

PLATE 217

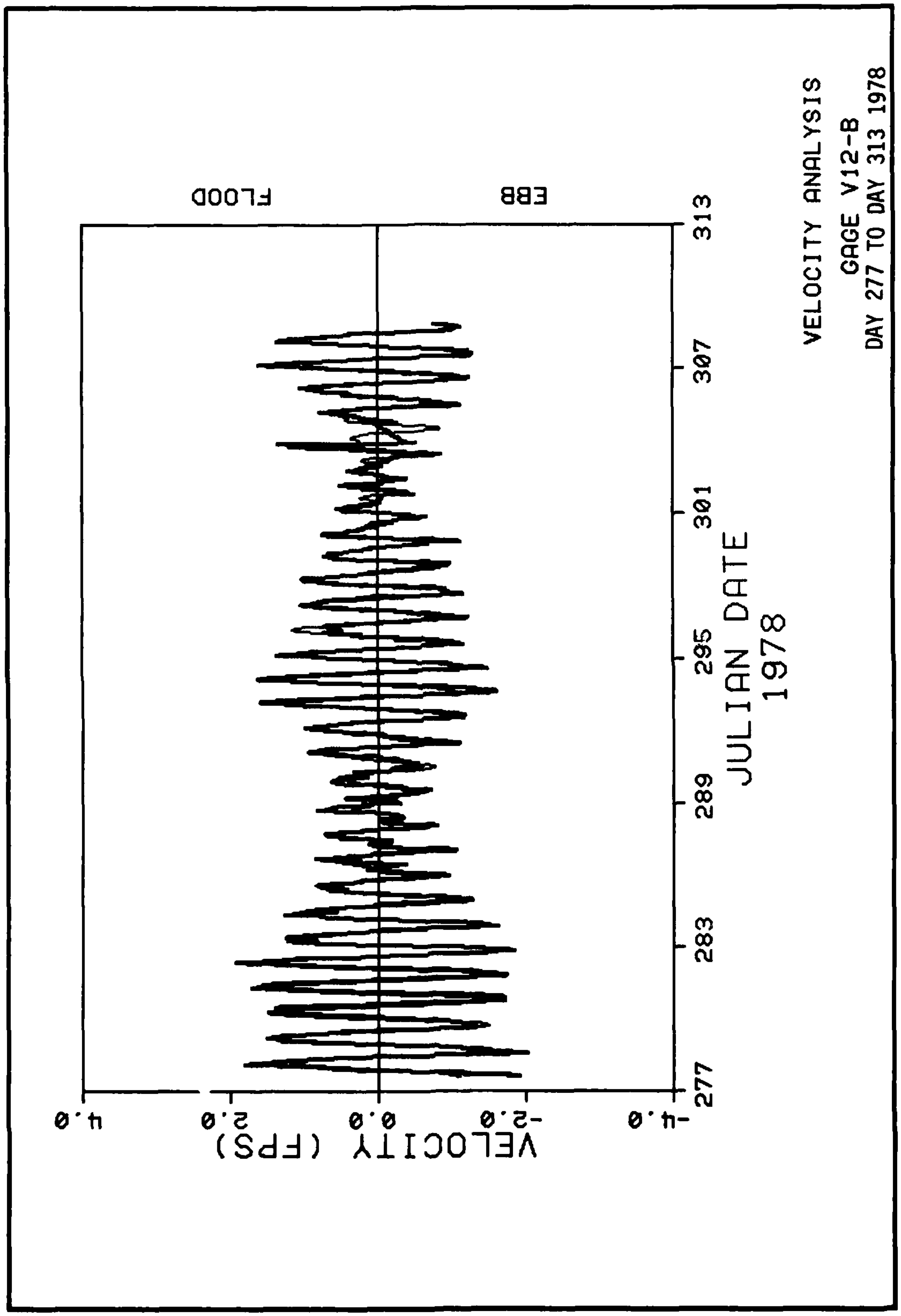

VELOCITY ANALYSIS
GAGE V12-B
DAY 277 TO DAY 313 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
277
283
289
295
301
307
313
JULIAN DATE
1978

PLATE 218

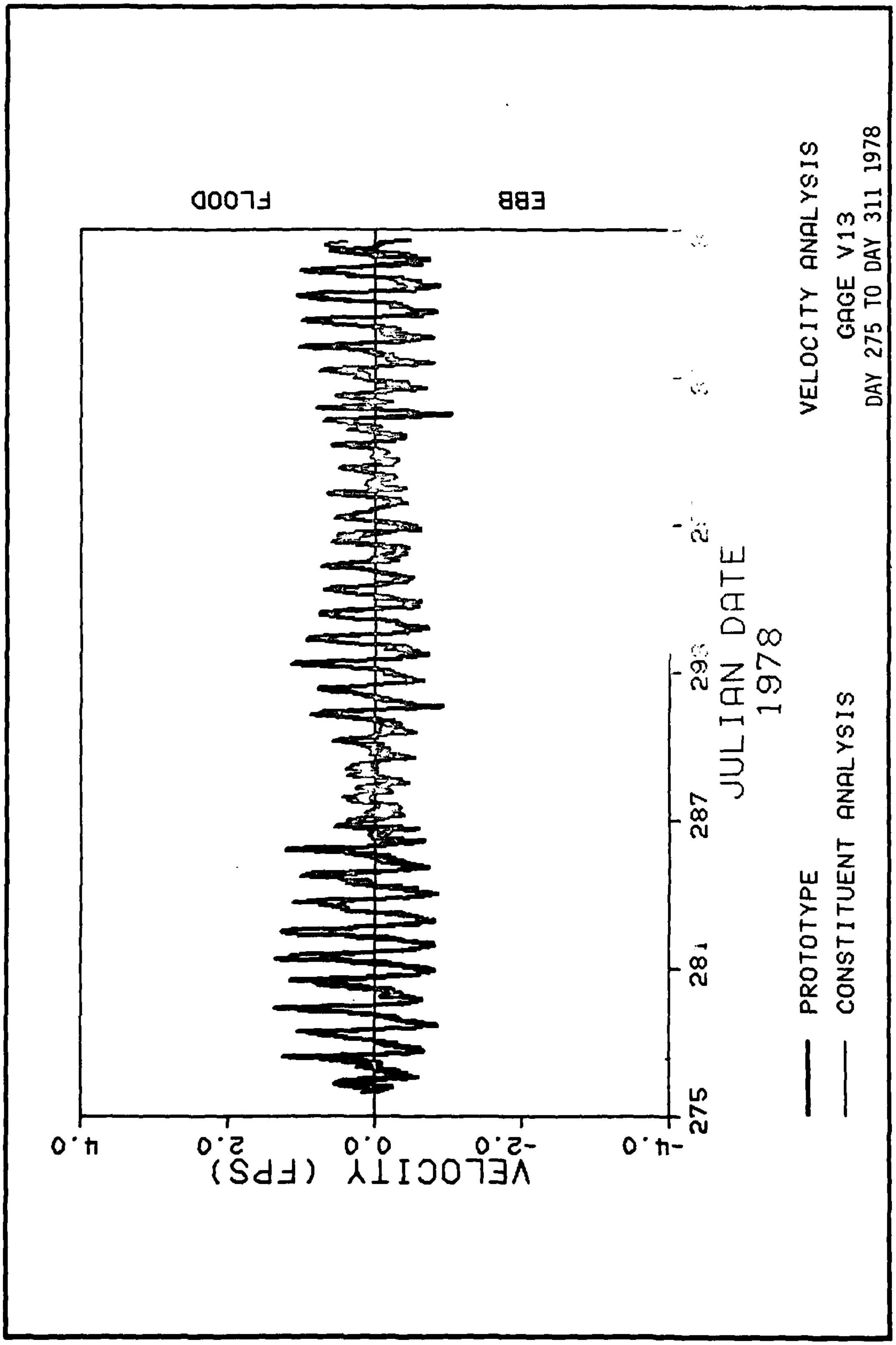
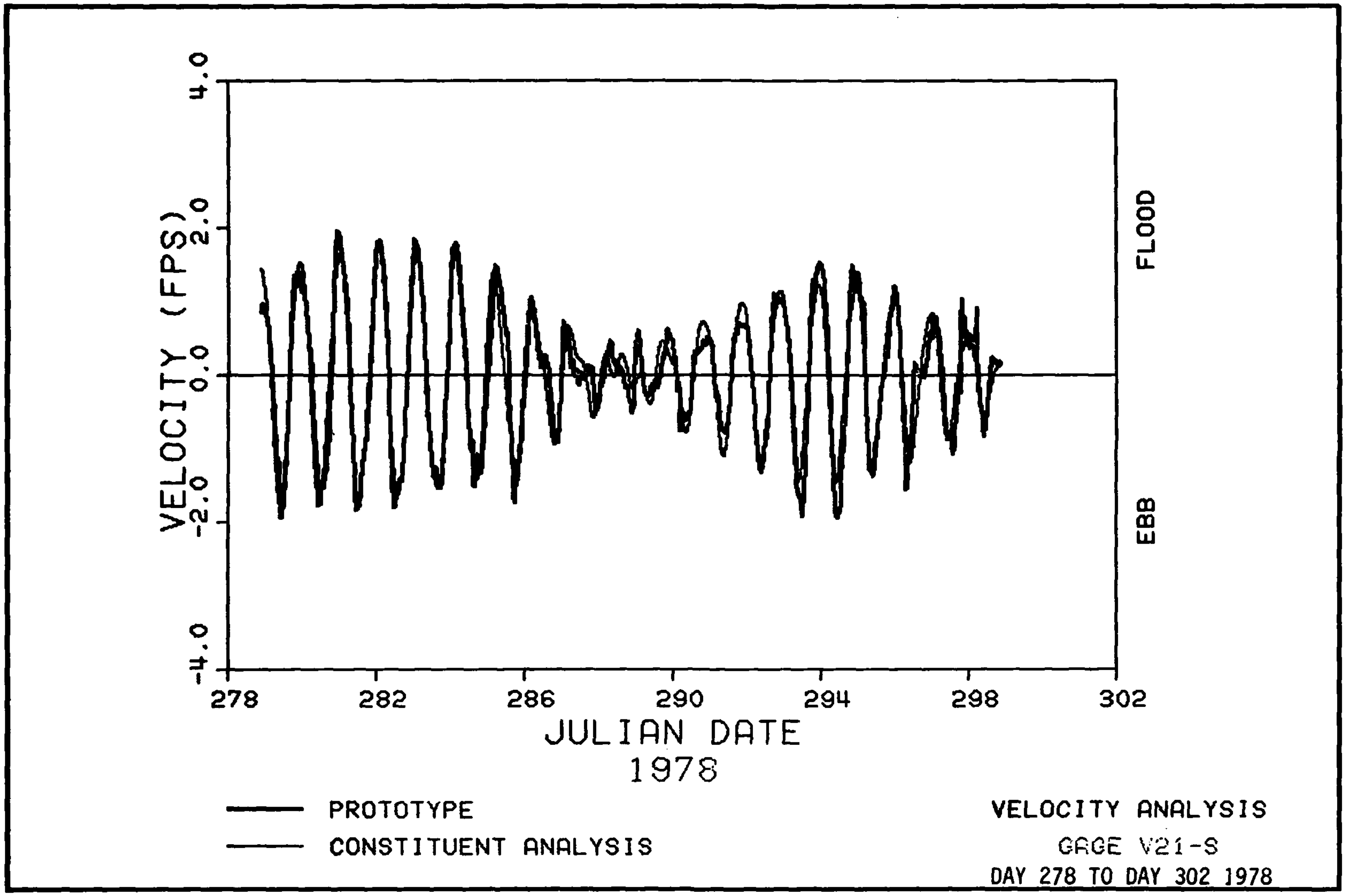
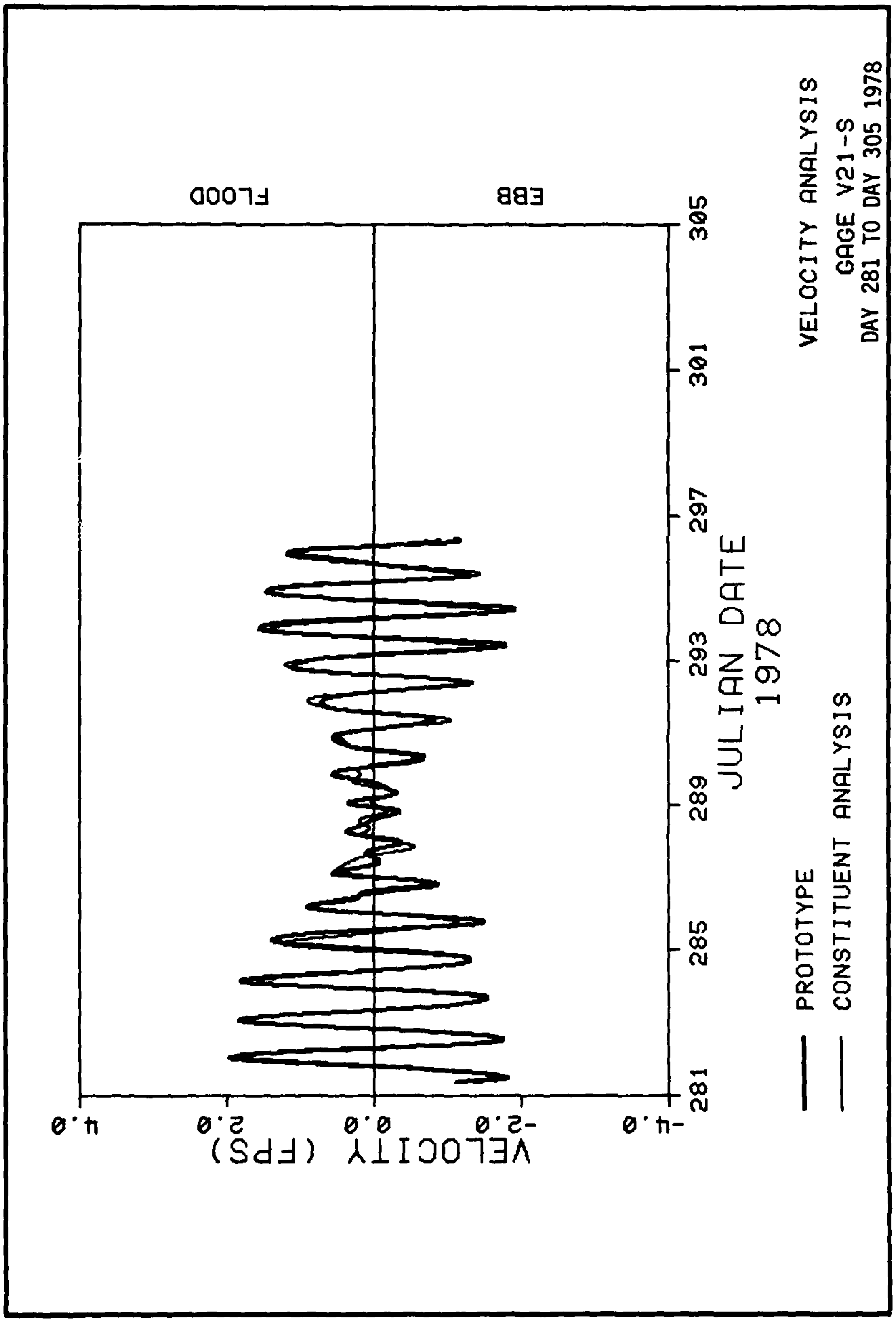
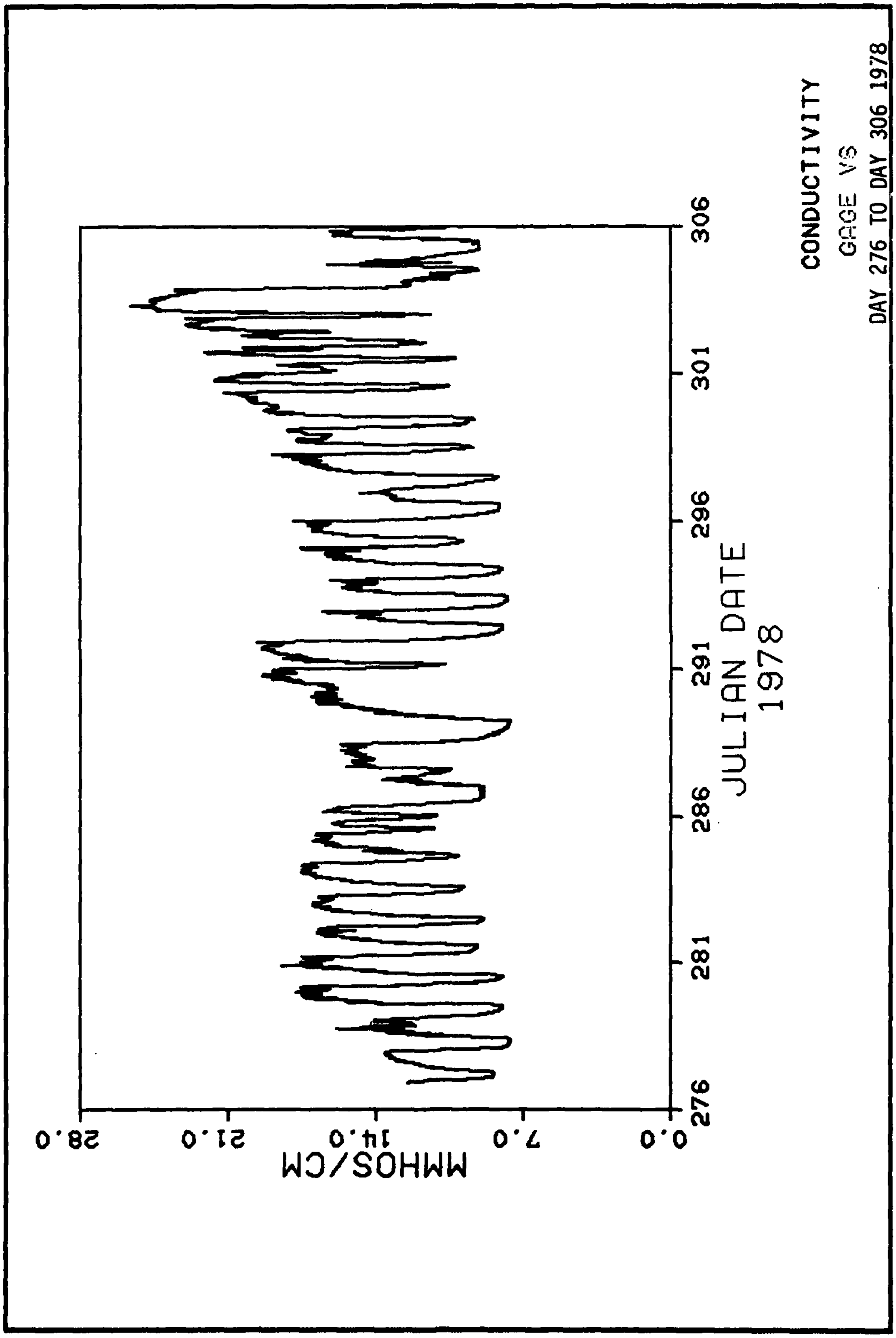

VELOCITY ANALYSIS
GAGE V13
DAY 275 TO DAY 311 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
275
281
287
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS

PLATE 219

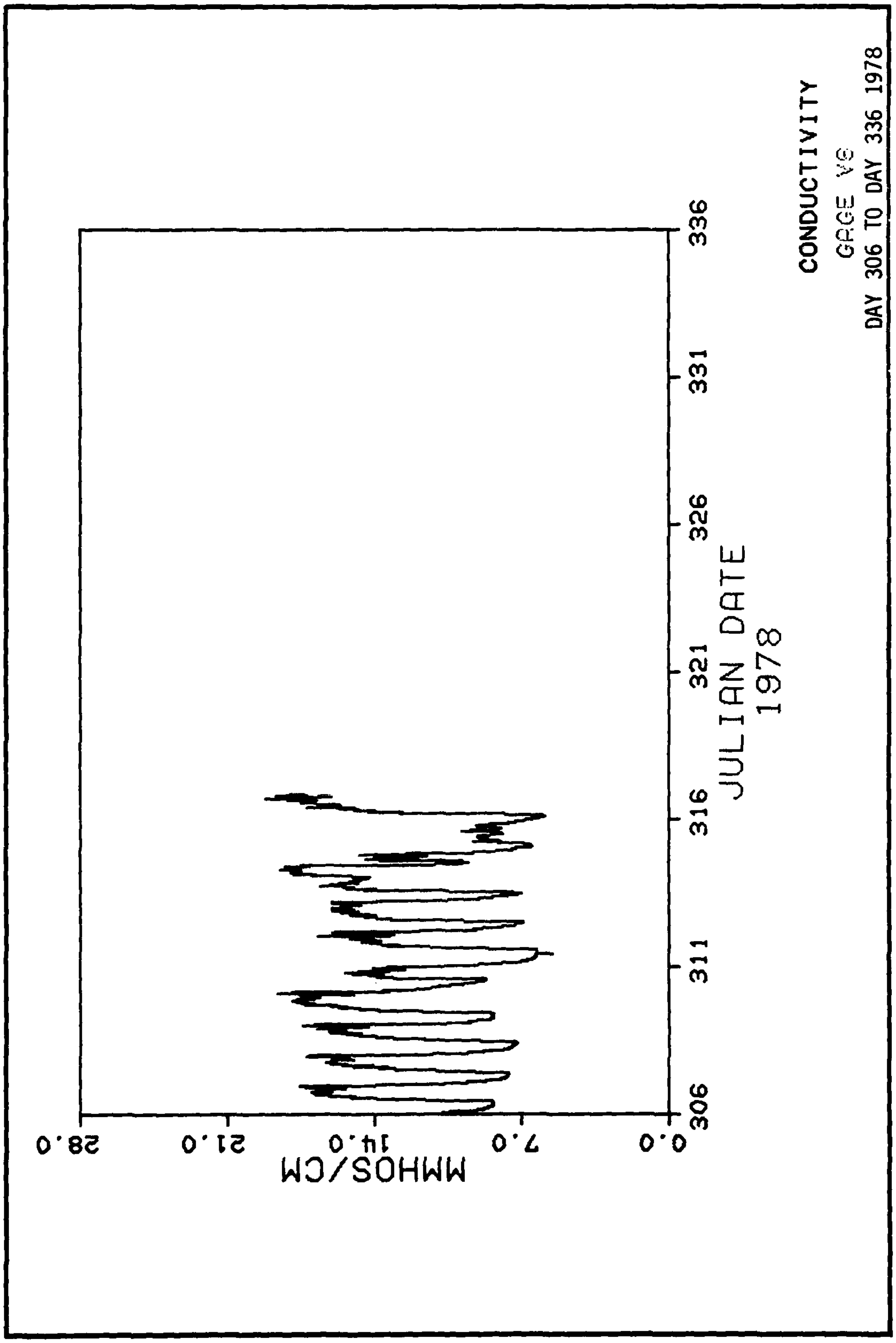

VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
FLOOD
EBB
278
282
286
290
294
298
302
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS
VELOCITY ANALYSIS
GAGE V21-S
DAY 278 TO DAY 302 1978


VELOCITY ANALYSIS
GAGE V21-S
DAY 281 TO DAY 305 1978
FLOOD
EBB
VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
281
285
289
293
297
301
305
JULIAN DATE
1978
PROTOTYPE
CONSTITUENT ANALYSIS



CONDUCTIVITY
GAGE V5
DAY 276 TO DAY 306 1978
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
JULIAN DATE
1978
276
281
286
291
296
301
306

PLATE 222


CONDUCTIVITY
GAGE V6
DAY 306 TO DAY 336 1978
JULIAN DATE
1978
306
311
316
321
326
331
336
MMHOS/CM
0.0
7.0
14.0
21.0
28.0

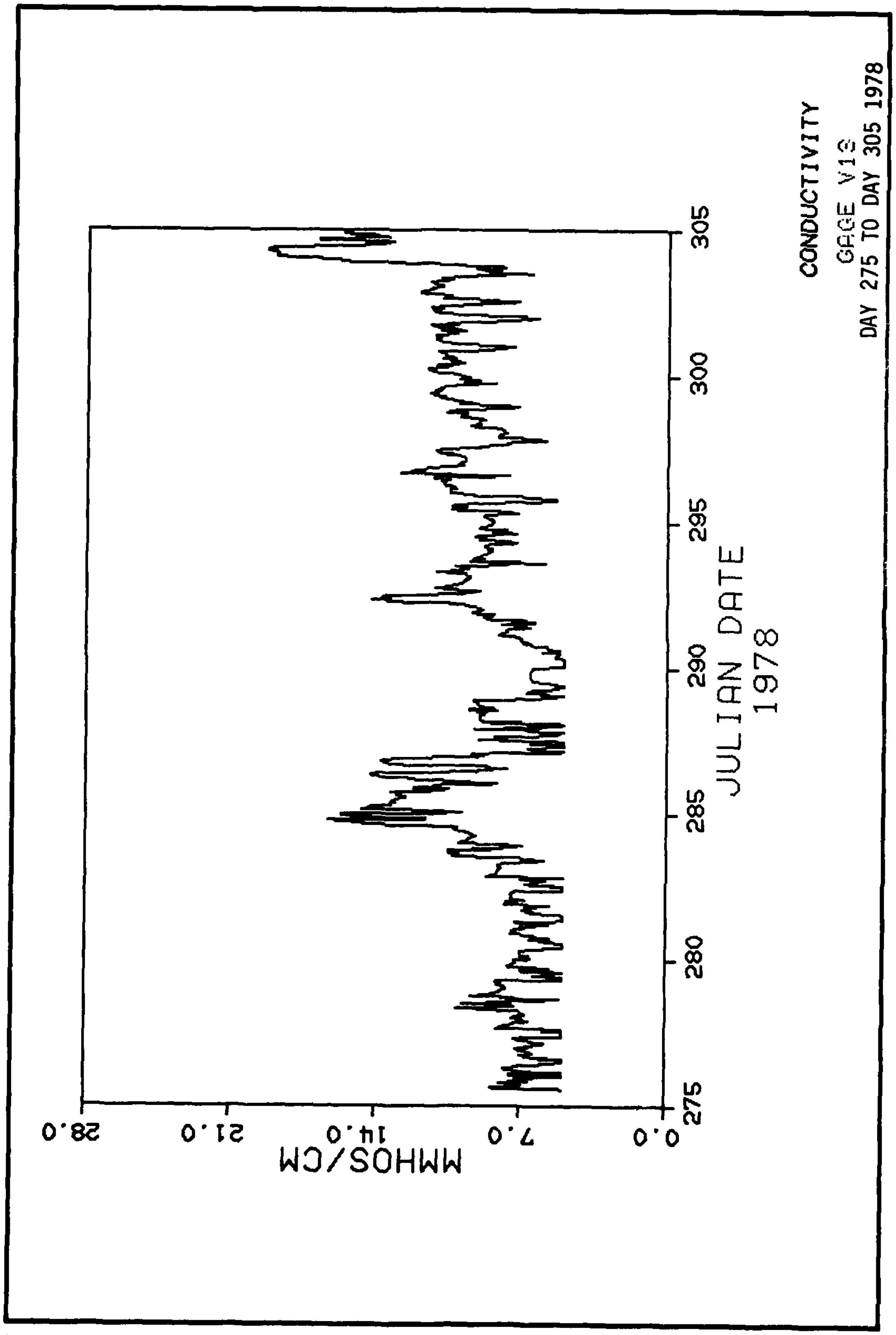
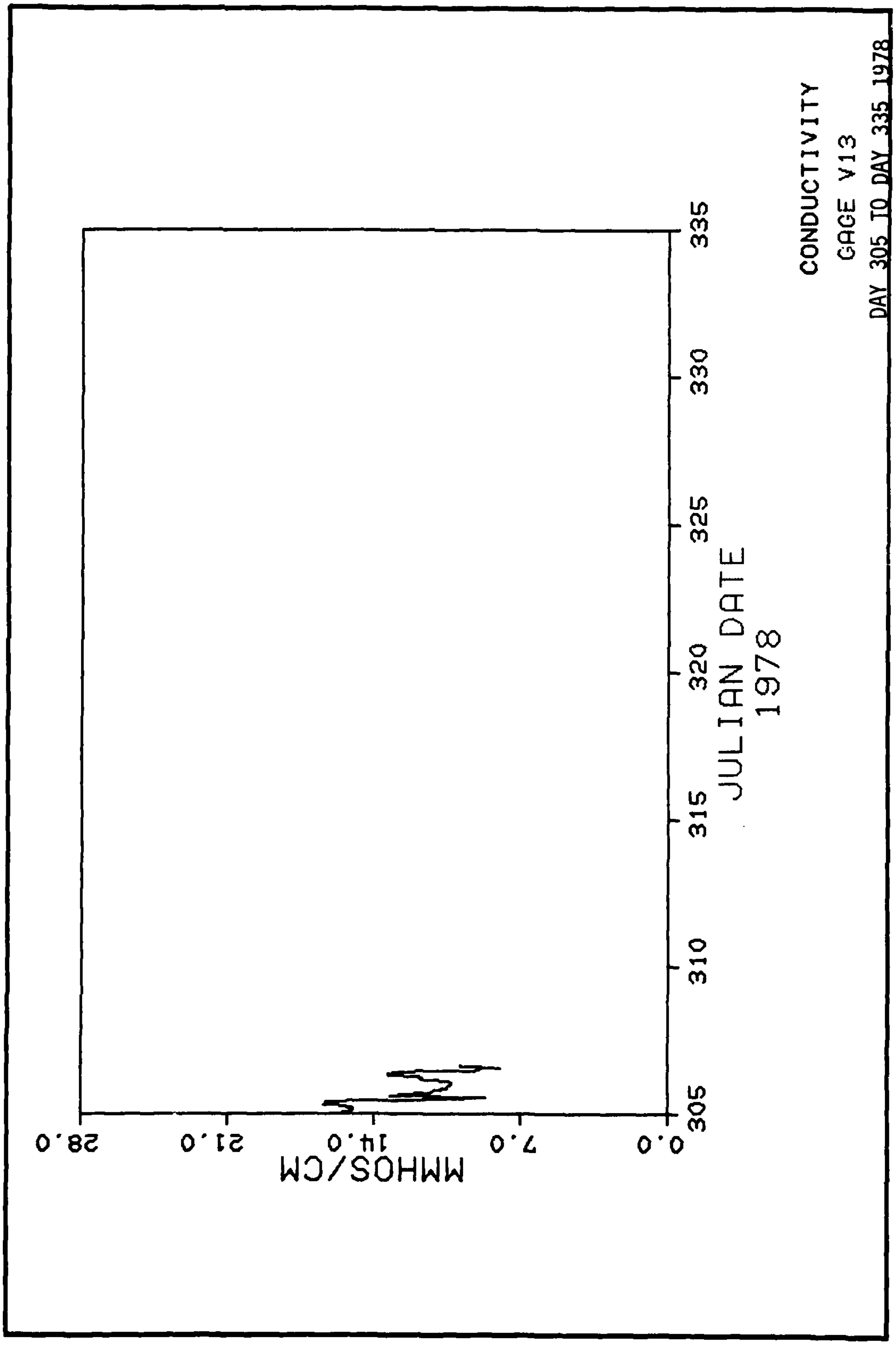
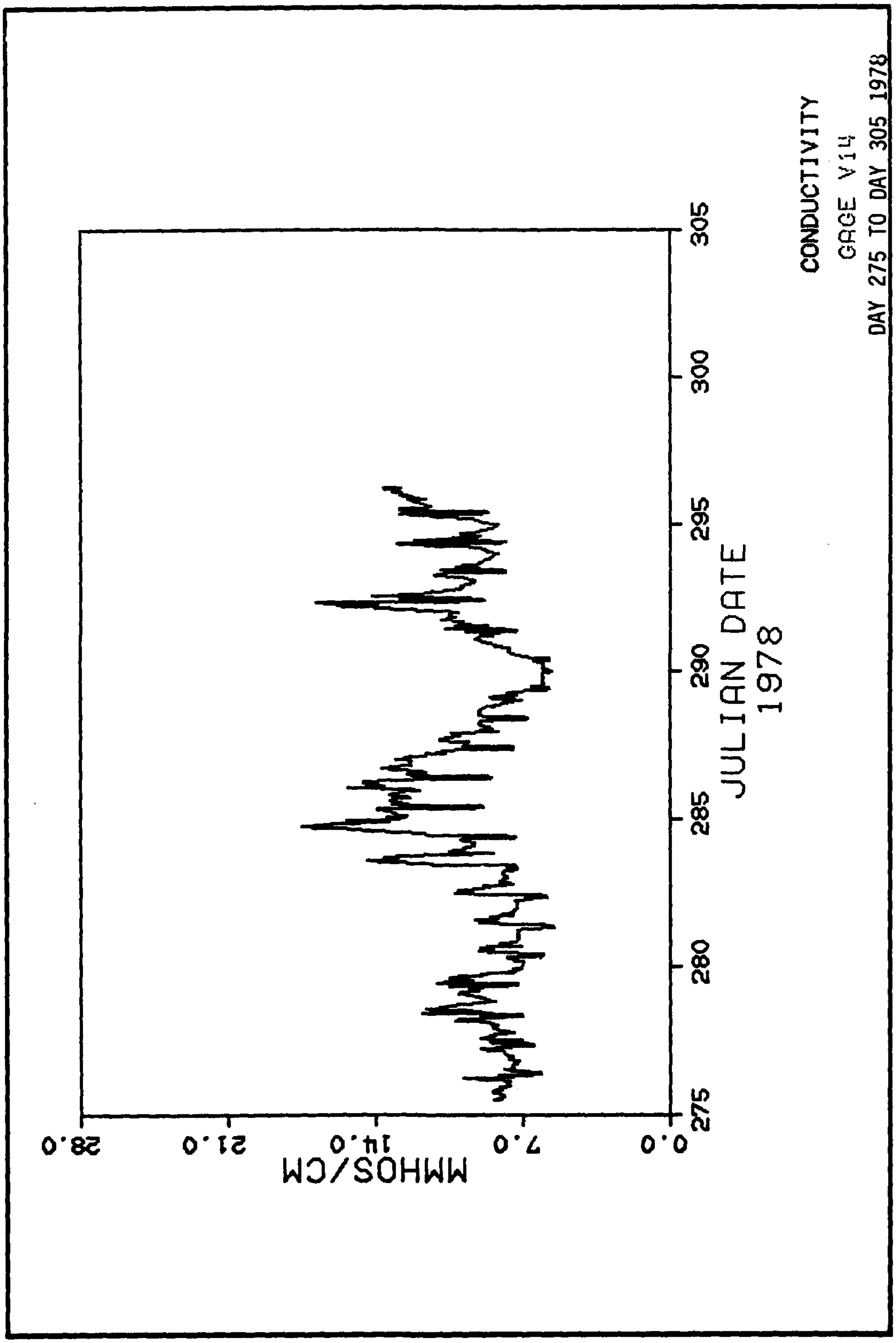

CONDUCTIVITY
GAGE V13
DAY 275 TO DAY 305 1978
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
JULIAN DATE
1978
275
280
285
290
295
300
305

PLATE 224


CONDUCTIVITY
GAGE V13
DAY 305 TO DAY 335 1978
JULIAN DATE
1978
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
305
310
315
320
325
330
335



CONDUCTIVITY
GAGE V14
DAY 275 TO DAY 305 1978
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
275
280
285
290
295
300
305
JULIAN DATE
1978

PLATE 226

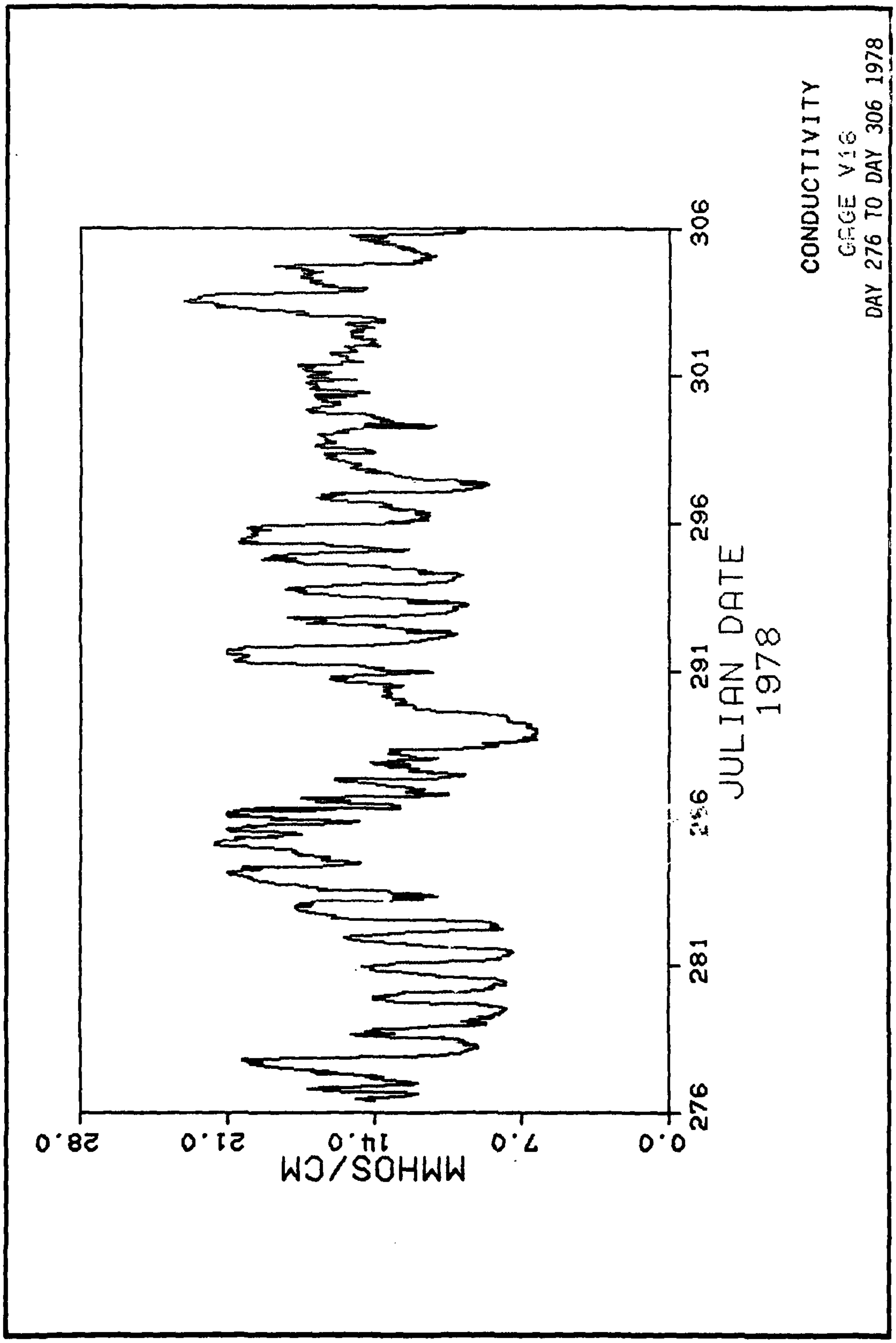

CONDUCTIVITY
GAGE V16
DAY 276 TO DAY 306 1978
JULIAN DATE
1978
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
276
281
286
291
296
301
306

PLATE 227

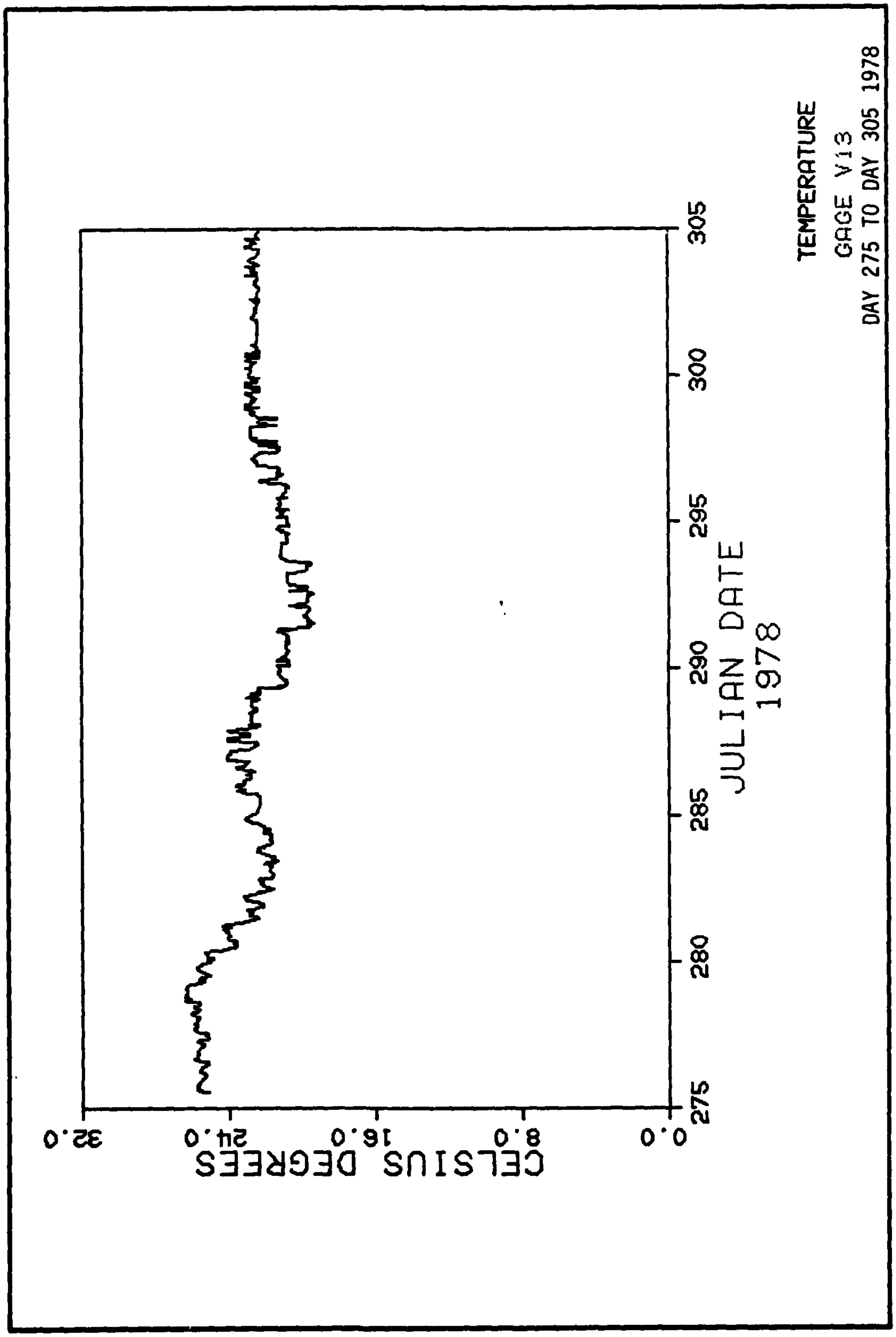
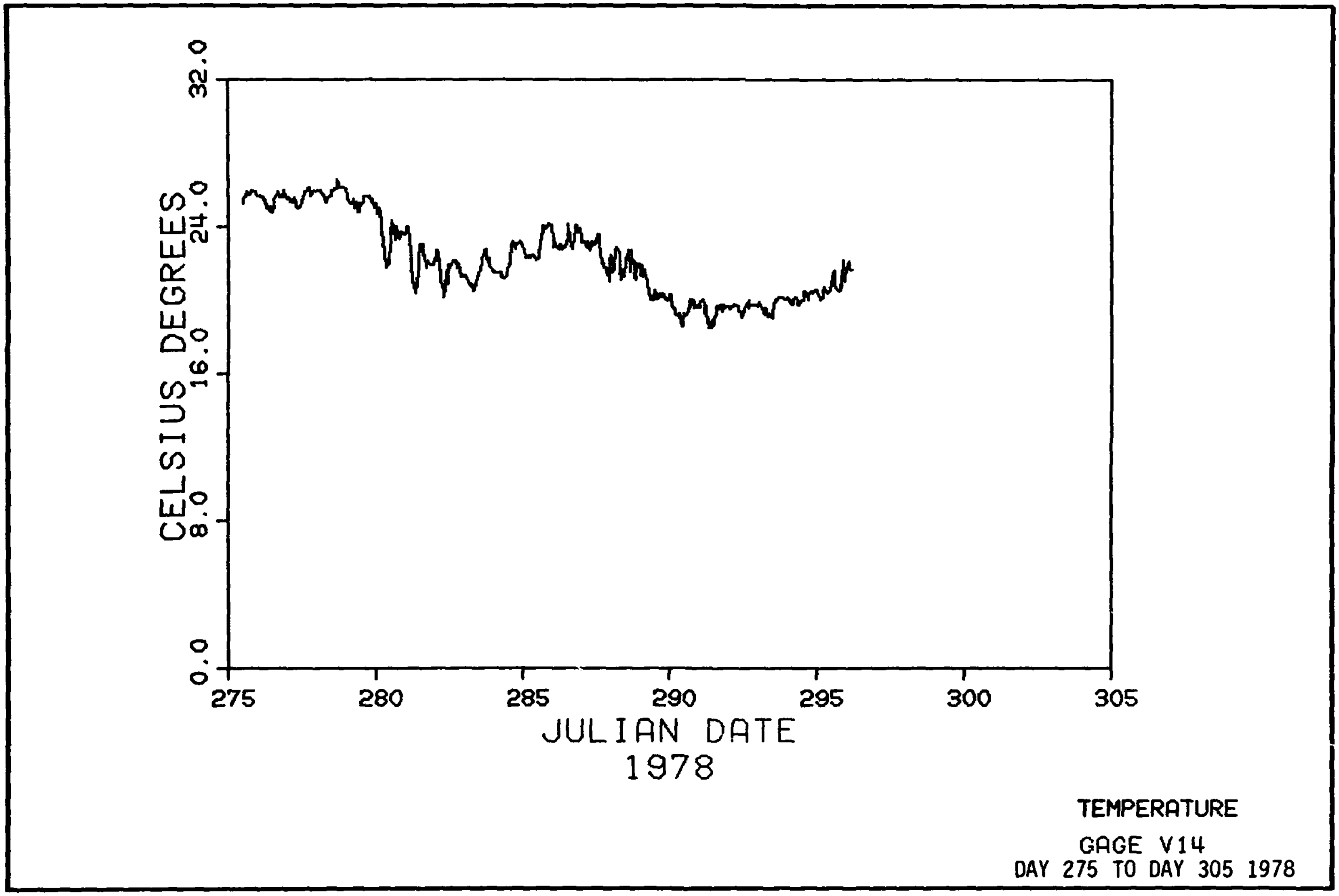

TEMPERATURE
GAGE V13
DAY 275 TO DAY 305 1978
JULIAN DATE
1978
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
275
280
285
290
295
300
305

PLATE 228


32.0
24.0
16.0
8.0
0.0
CELSIUS DEGREES
275
280
285
290
295
300
305
JULIAN DATE
1978
TEMPERATURE
GAGE V14
DAY 275 TO DAY 305 1978

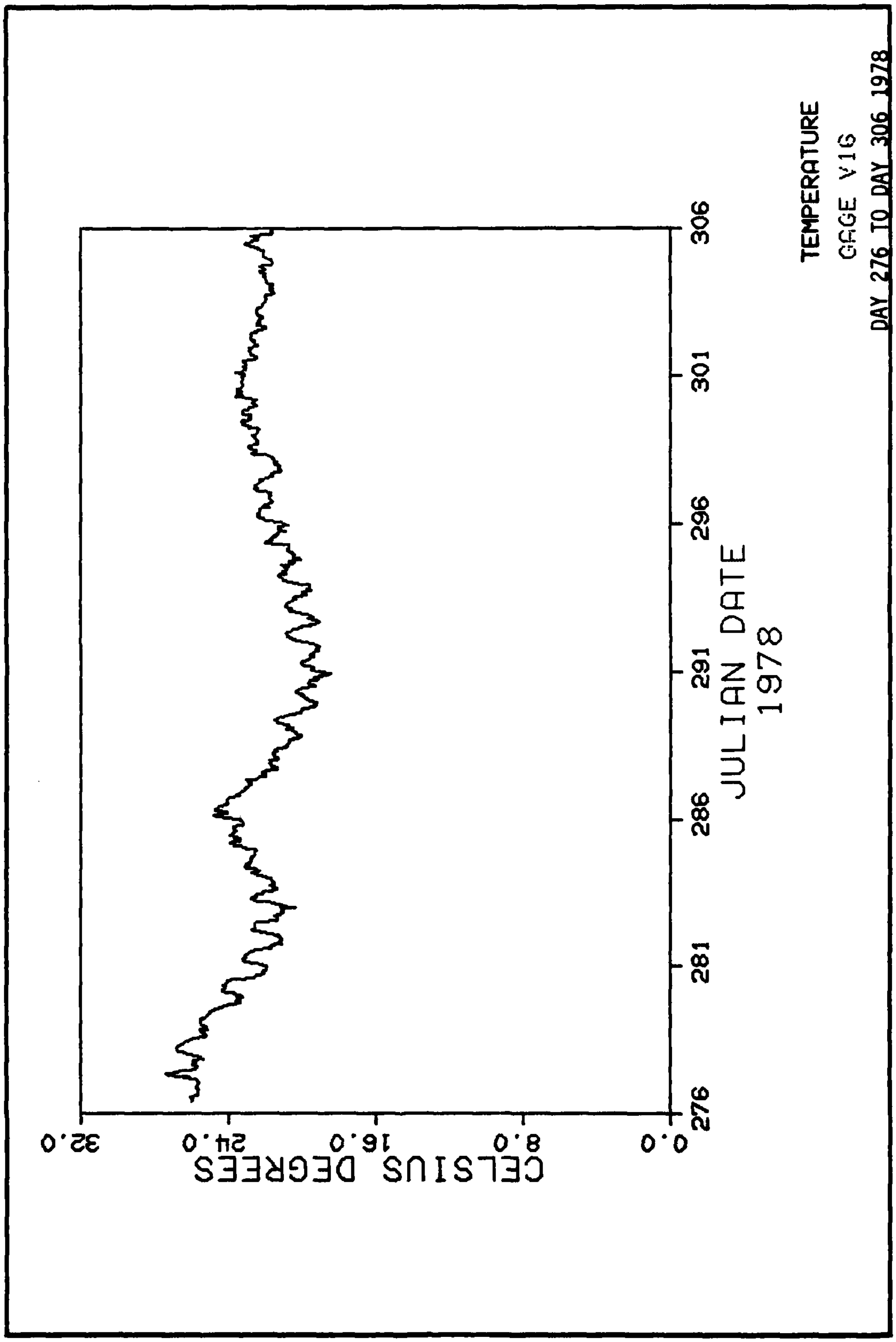
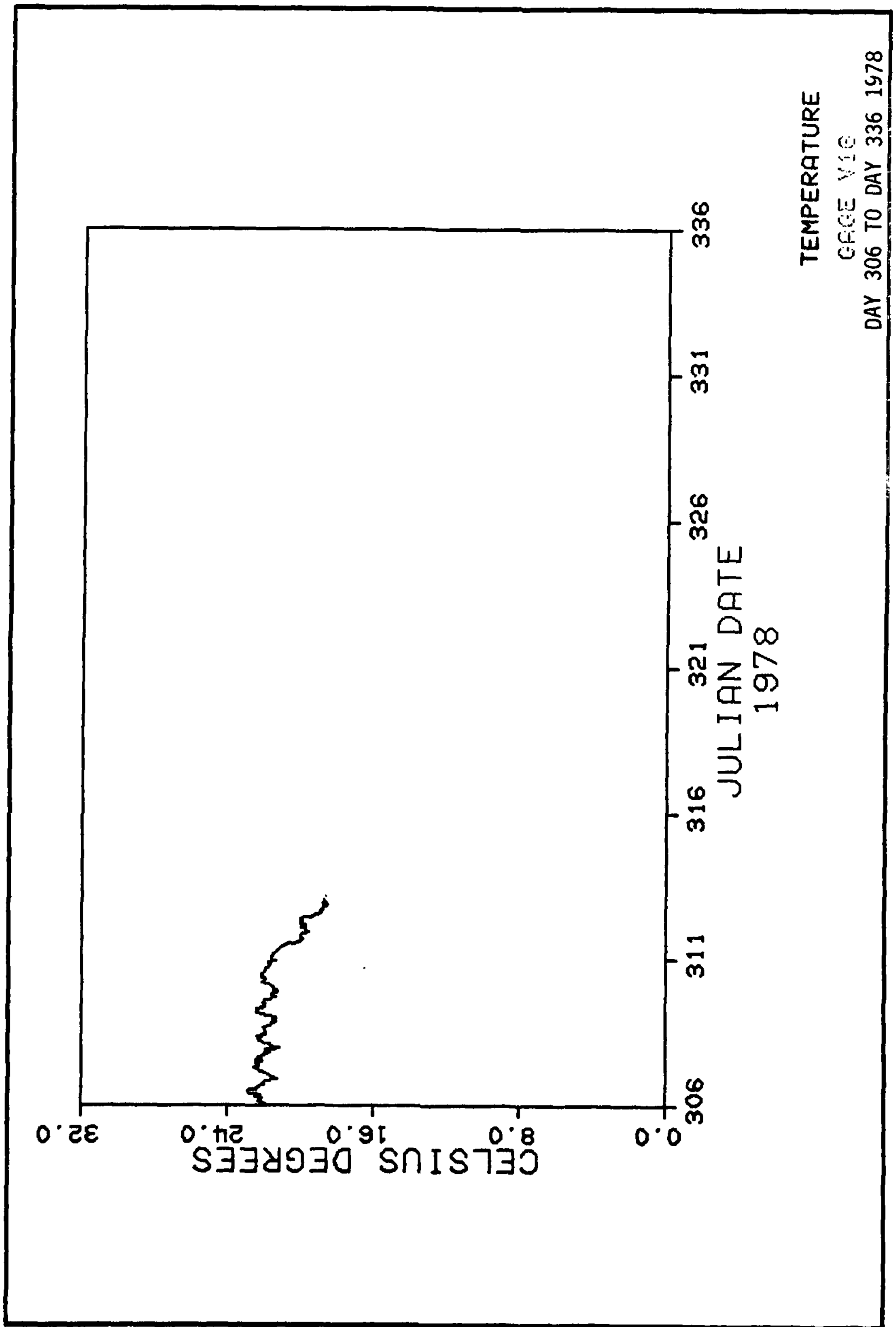

TEMPERATURE
GAGE V16
DAY 276 TO DAY 306 1978
JULIAN DATE
1978
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
276
281
286
291
296
301
306

PLATE 230


TEMPERATURE
DAY 306 TO DAY 336 1978
JULIAN DATE
1978
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
306
311
316
321
326
331
336

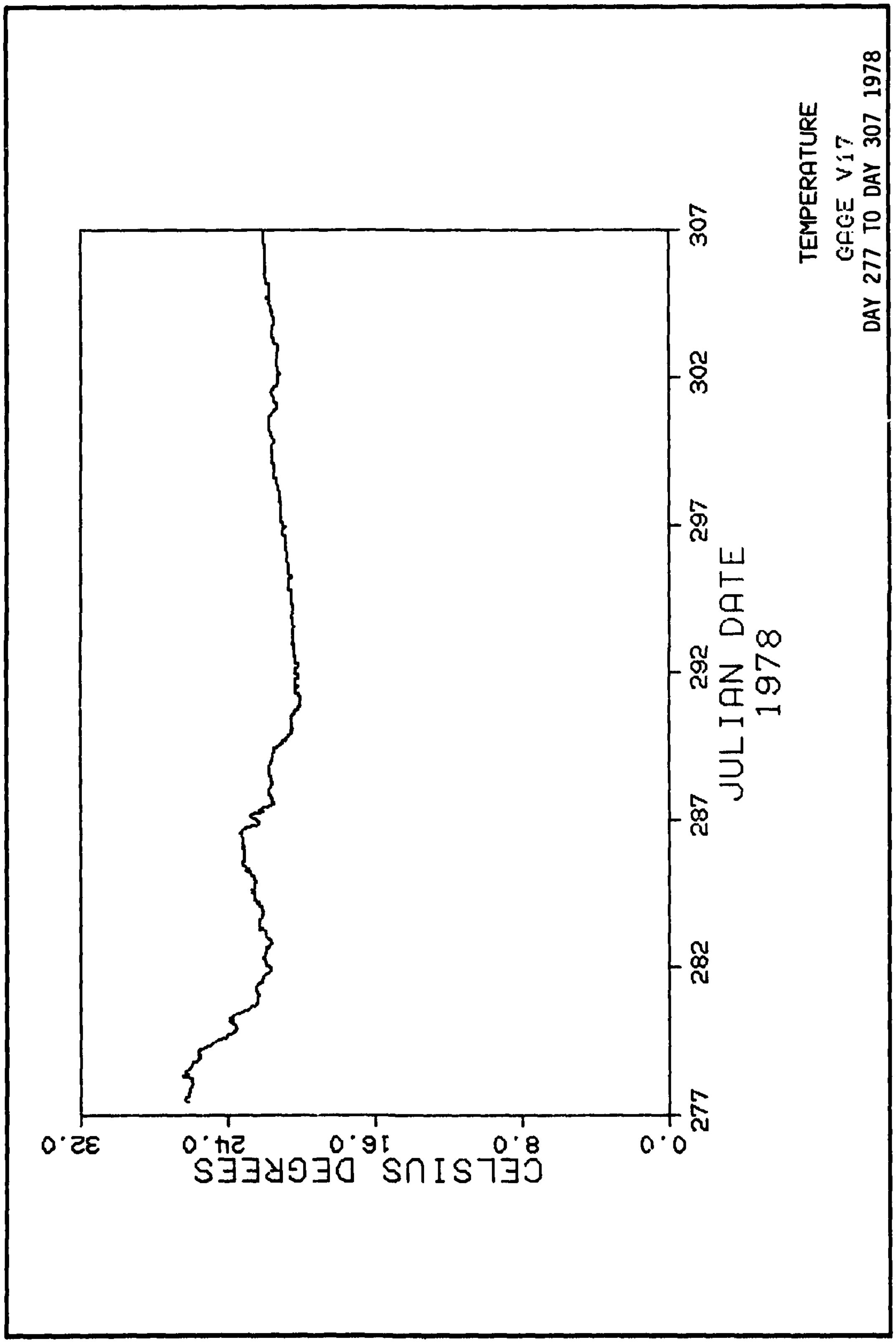
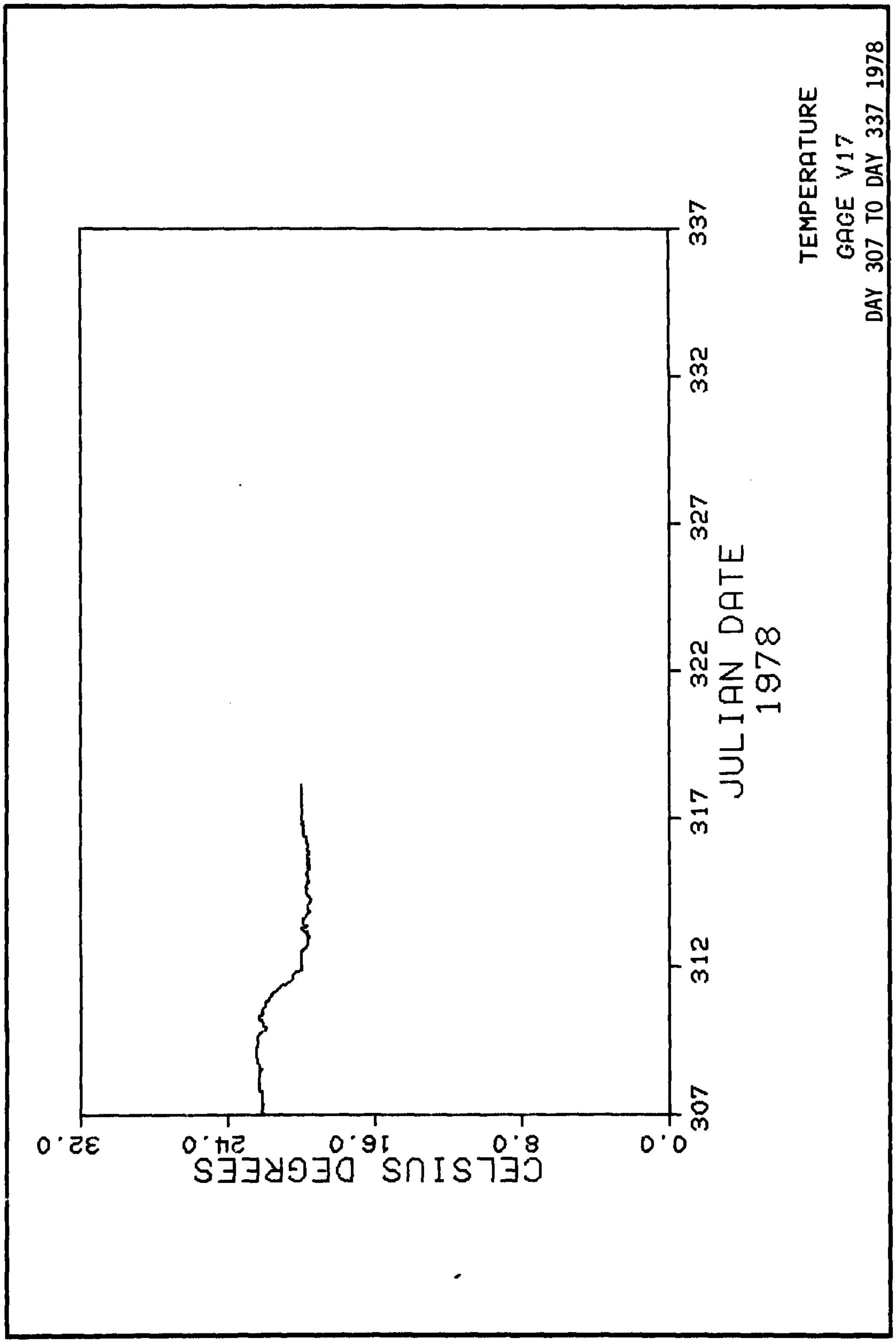

TEMPERATURE
GAGE V17
DAY 277 TO DAY 307 1978
JULIAN DATE
1978
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
277
282
287
292
297
302
307

PLATE 232


TEMPERATURE
GAGE V17
DAY 307 TO DAY 337 1978
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
JULIAN DATE
1978
307
312
317
322
327
332
337

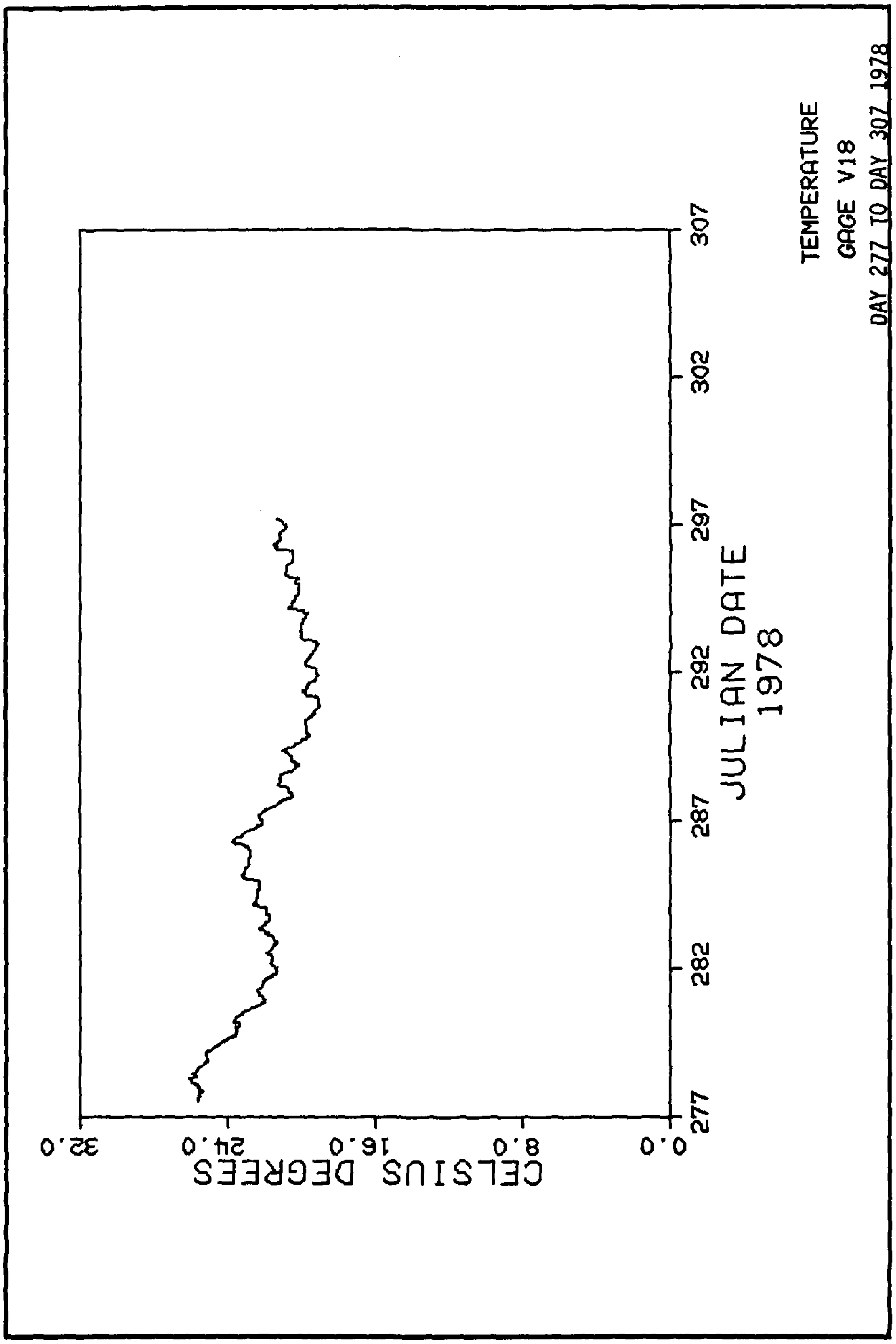
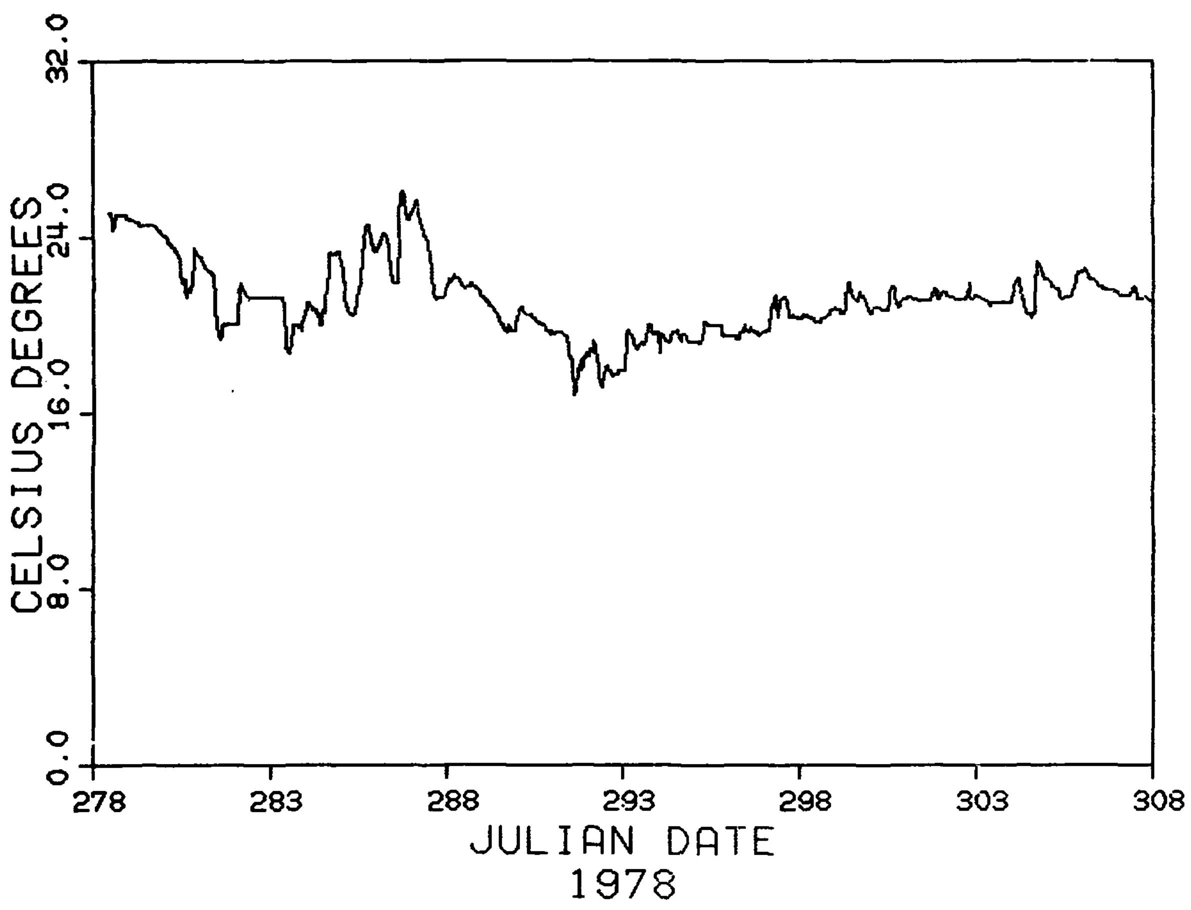

TEMPERATURE
GAGE V18
DAY 277 TO DAY 307 1978
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
JULIAN DATE
1978
277
282
287
292
297
302
307

PLATE 234



TEMPERATURE
GAGE V20
DAY 278 TO DAY 308 1978

PLATE 235

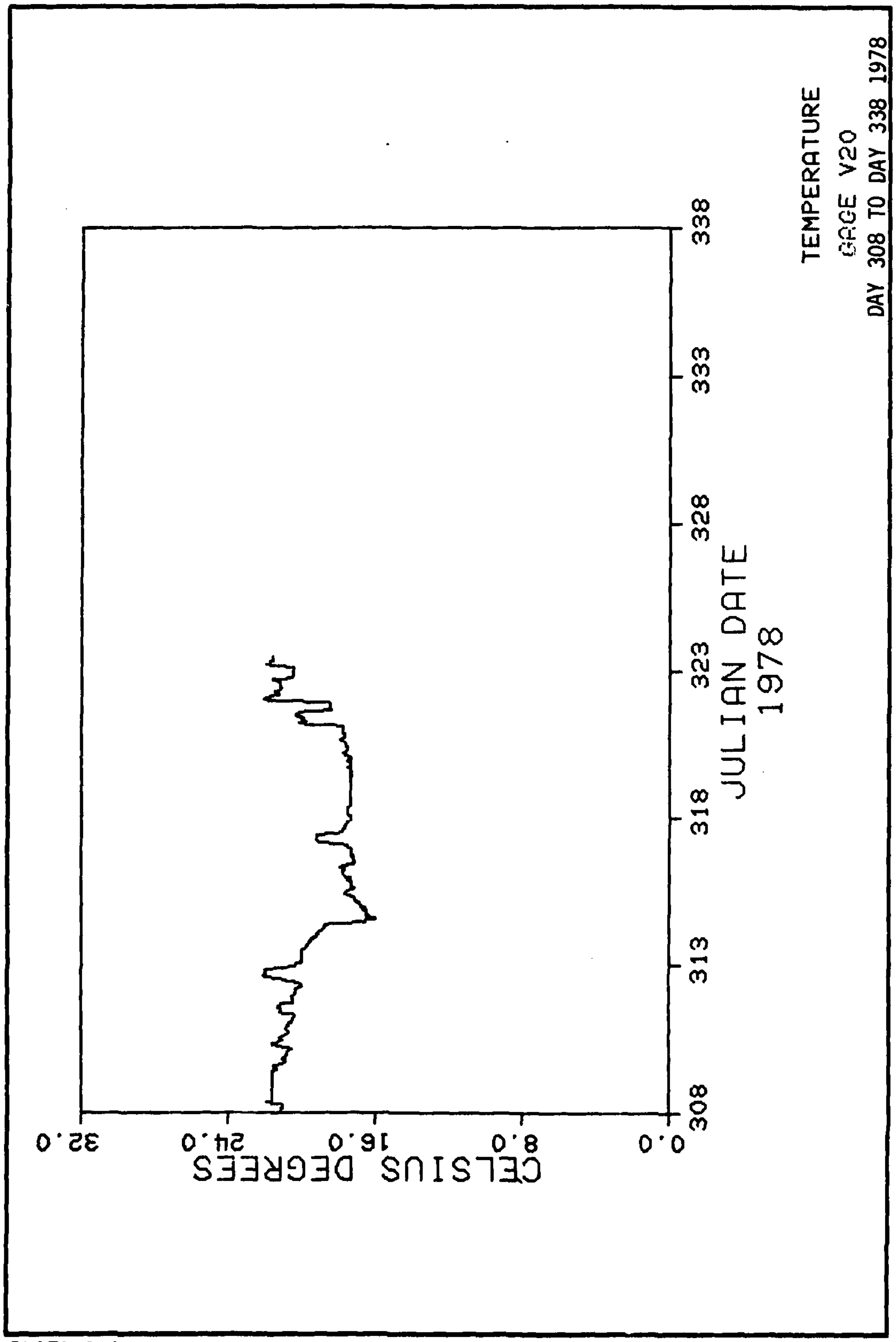

TEMPERATURE
GAGE V20
DAY 308 TO DAY 338 1978
JULIAN DATE
1978
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
308
313
318
323
328
333
338

PLATE 236

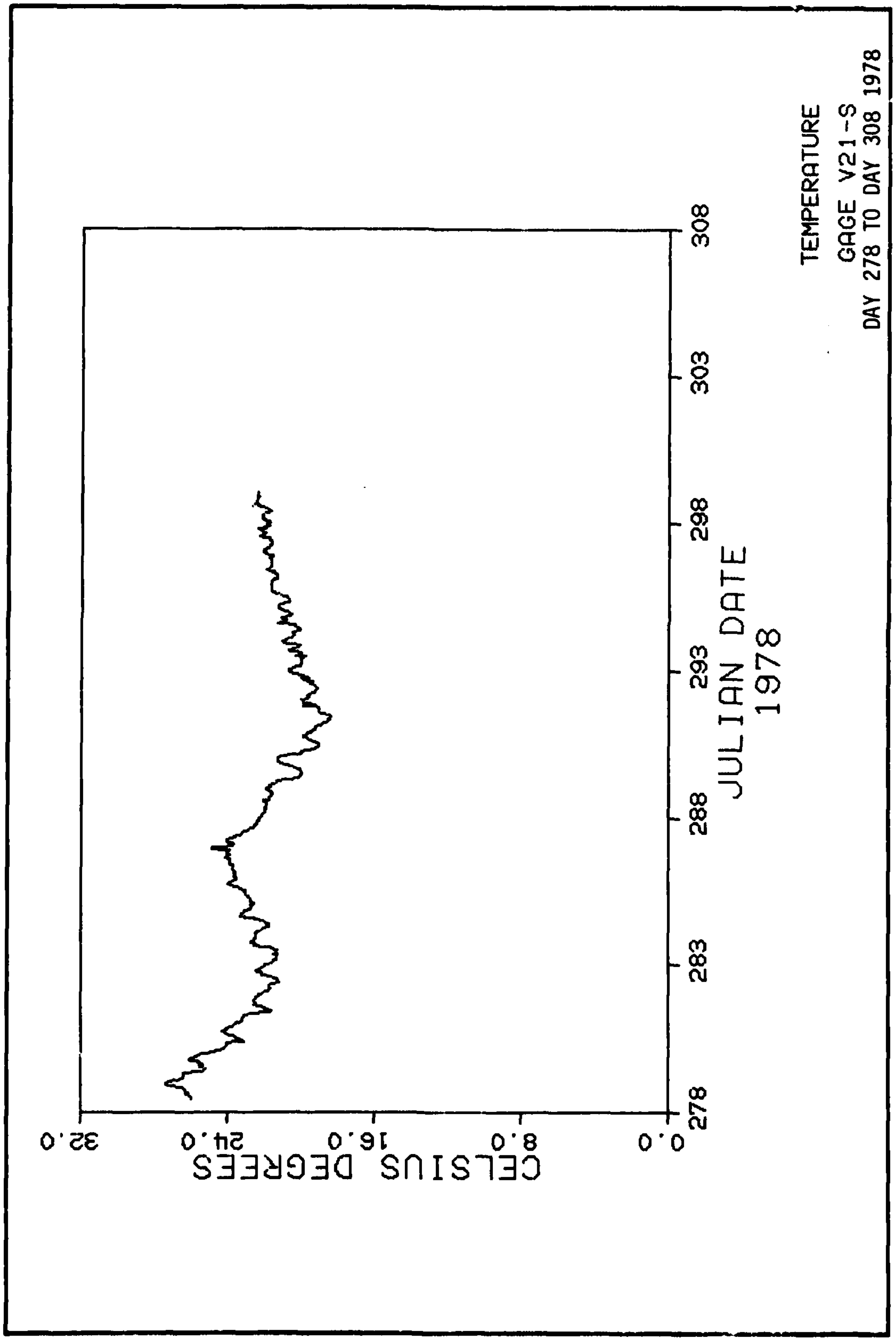

TEMPERATURE
GAGE V21-S
DAY 278 TO DAY 308 1978
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
278
283
288
293
298
303
308
JULIAN DATE
1978

PLATE 237

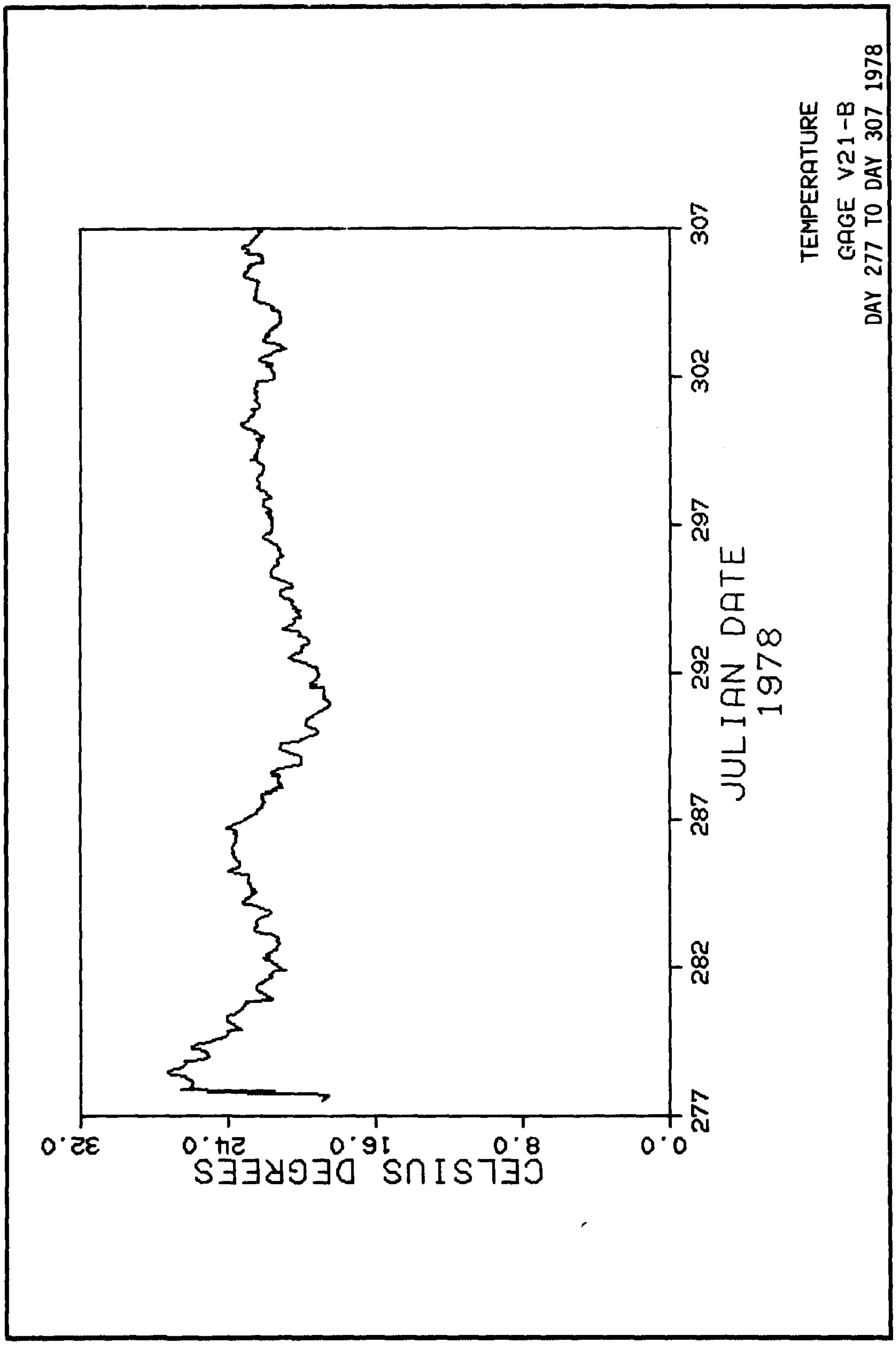
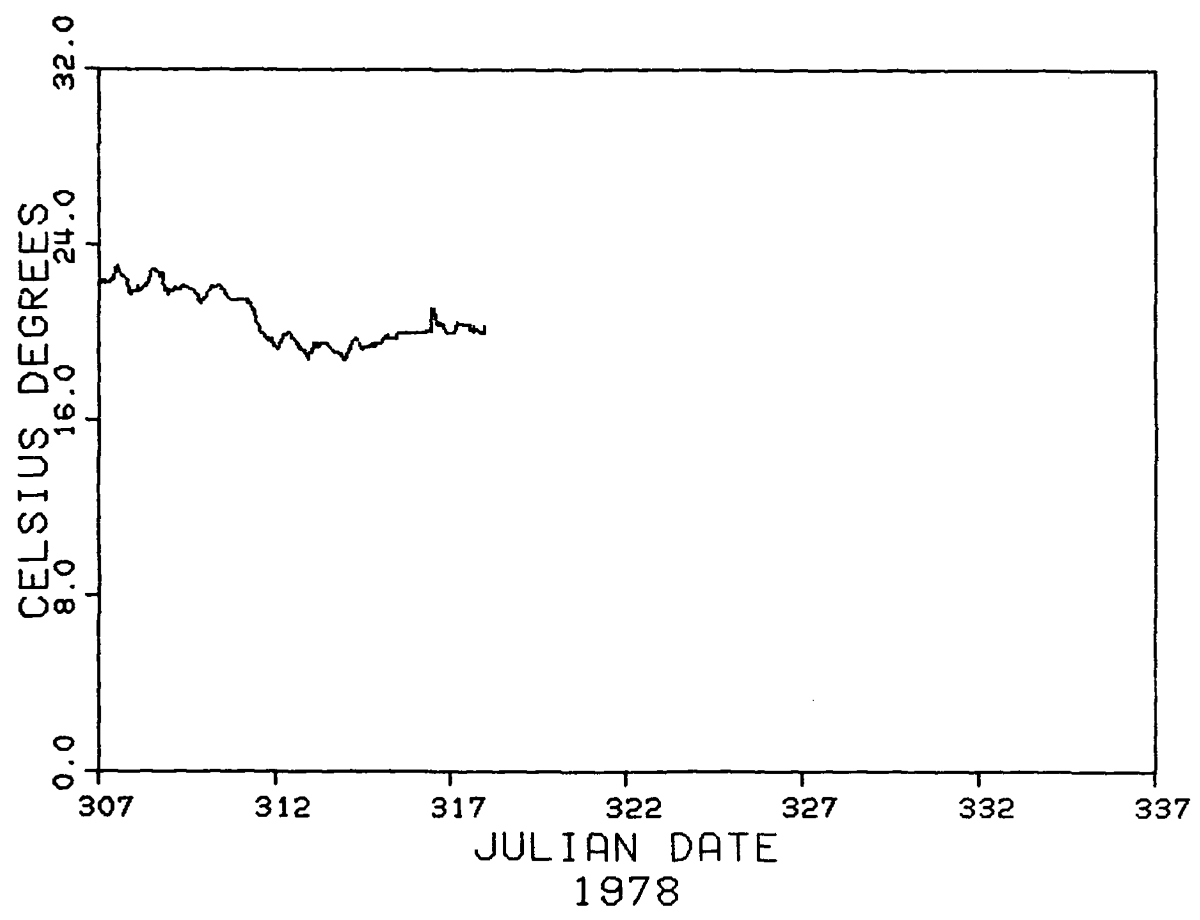

TEMPERATURE
GAGE V21-B
DAY 277 TO DAY 307 1978
JULIAN DATE
1978
277
282
287
292
297
302
307
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0

PLATE 238



TEMPERATURE
GAGE V21-B
DAY 307 TO DAY 337 1978

PLATE 239

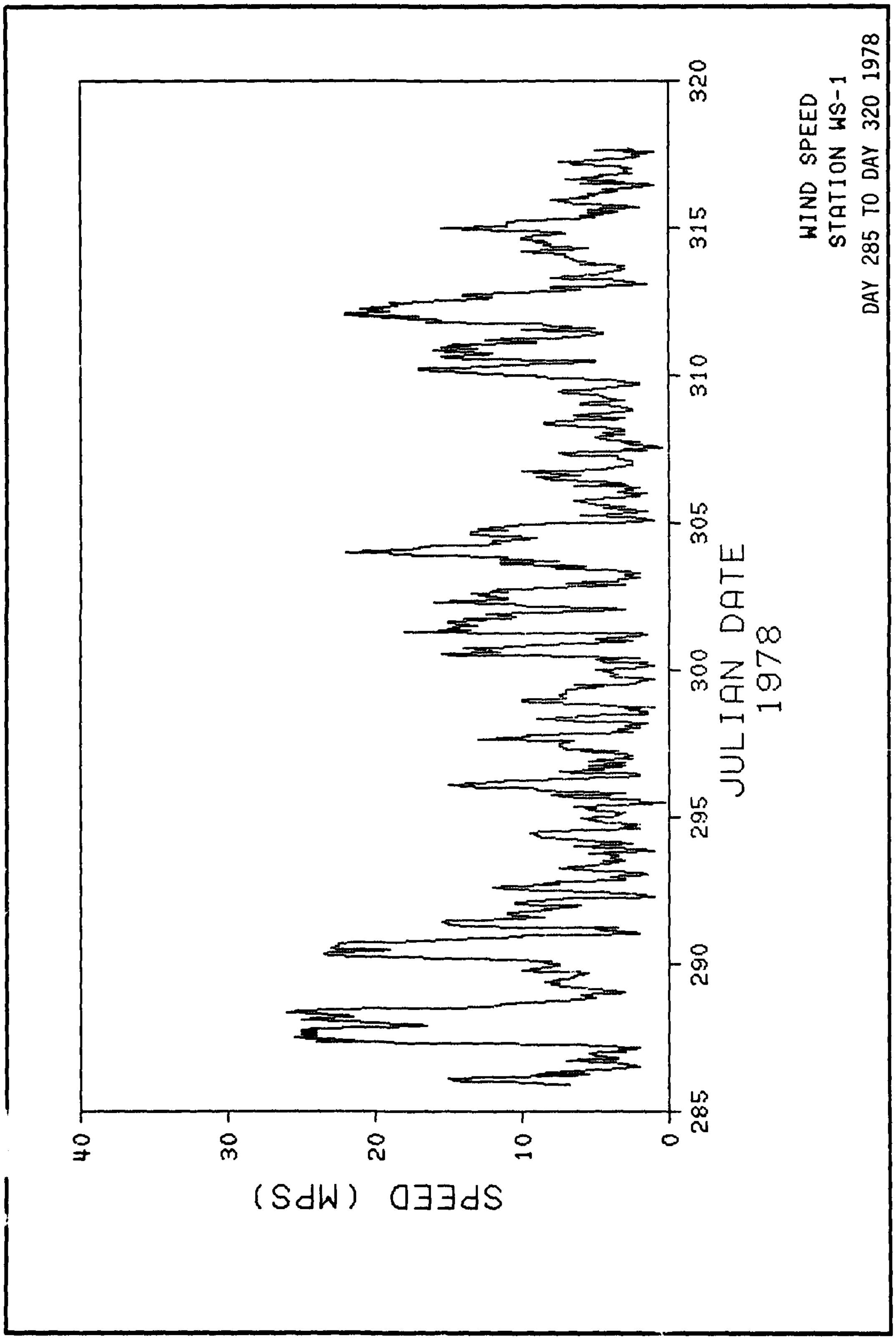
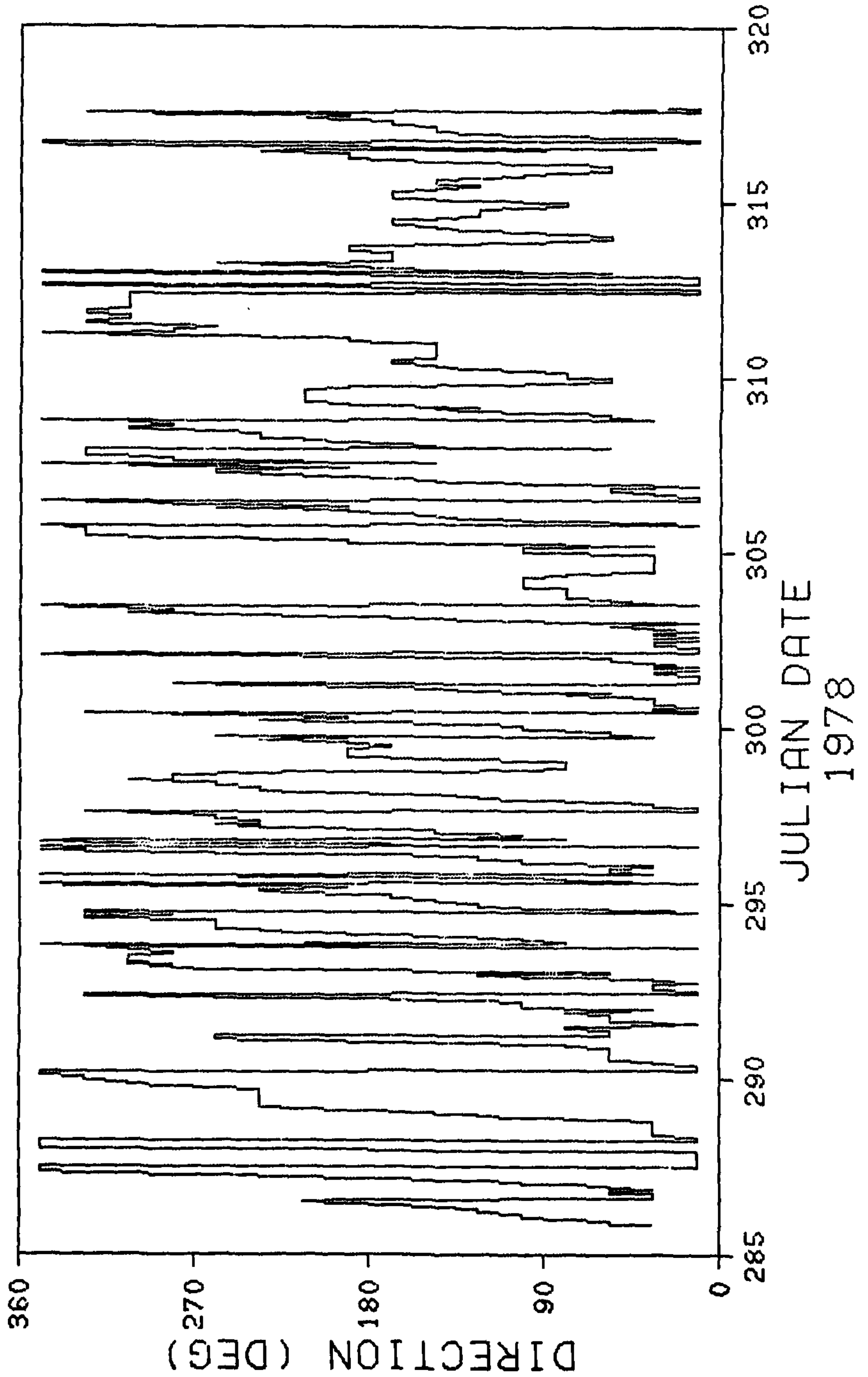
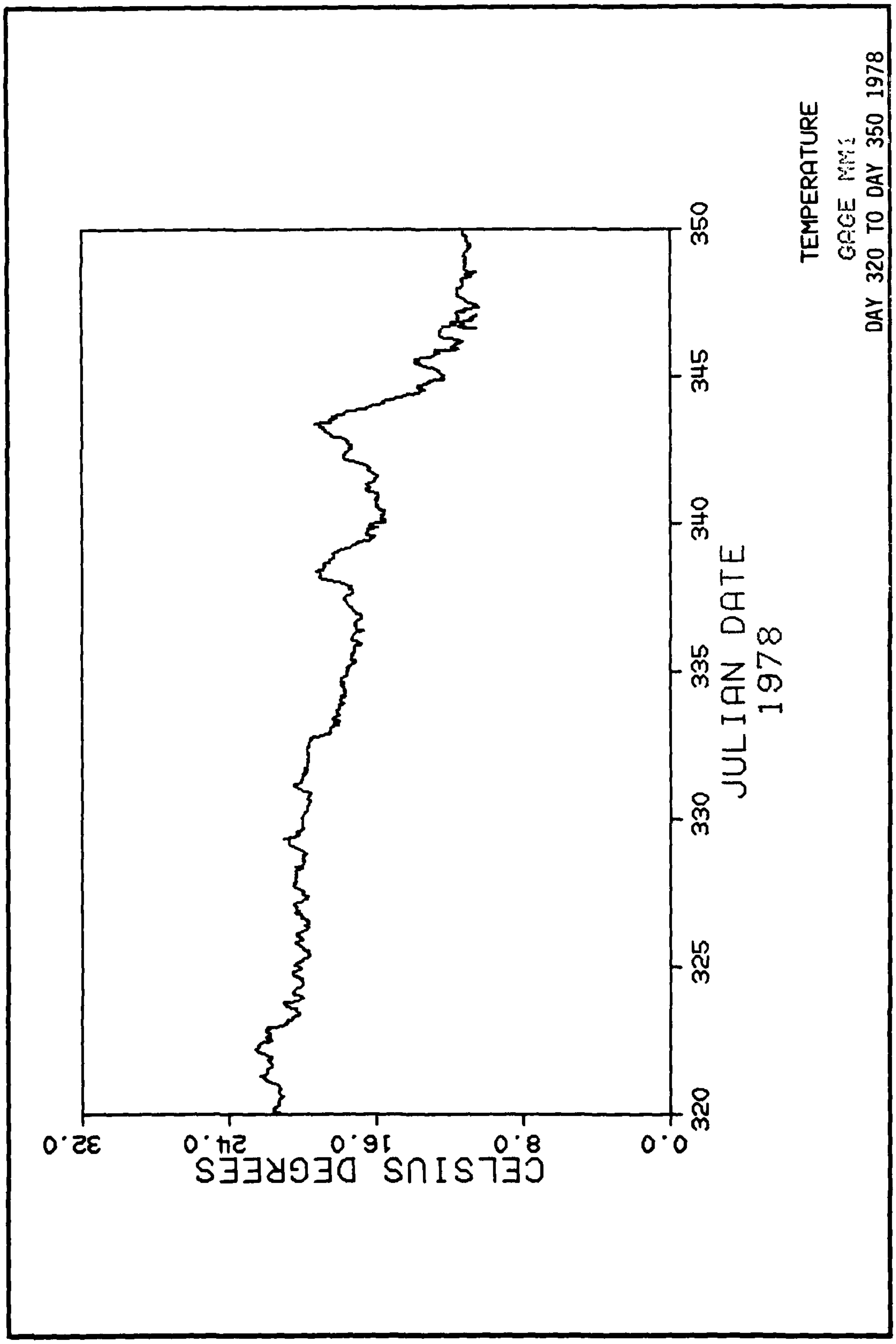

WIND SPEED
STATION WS-1
DAY 285 TO DAY 320 1978
JULIAN DATE
1978
SPEED (MPS)
0
10
20
30
40
285
290
295
300
305
310
315
320

PLATE 240



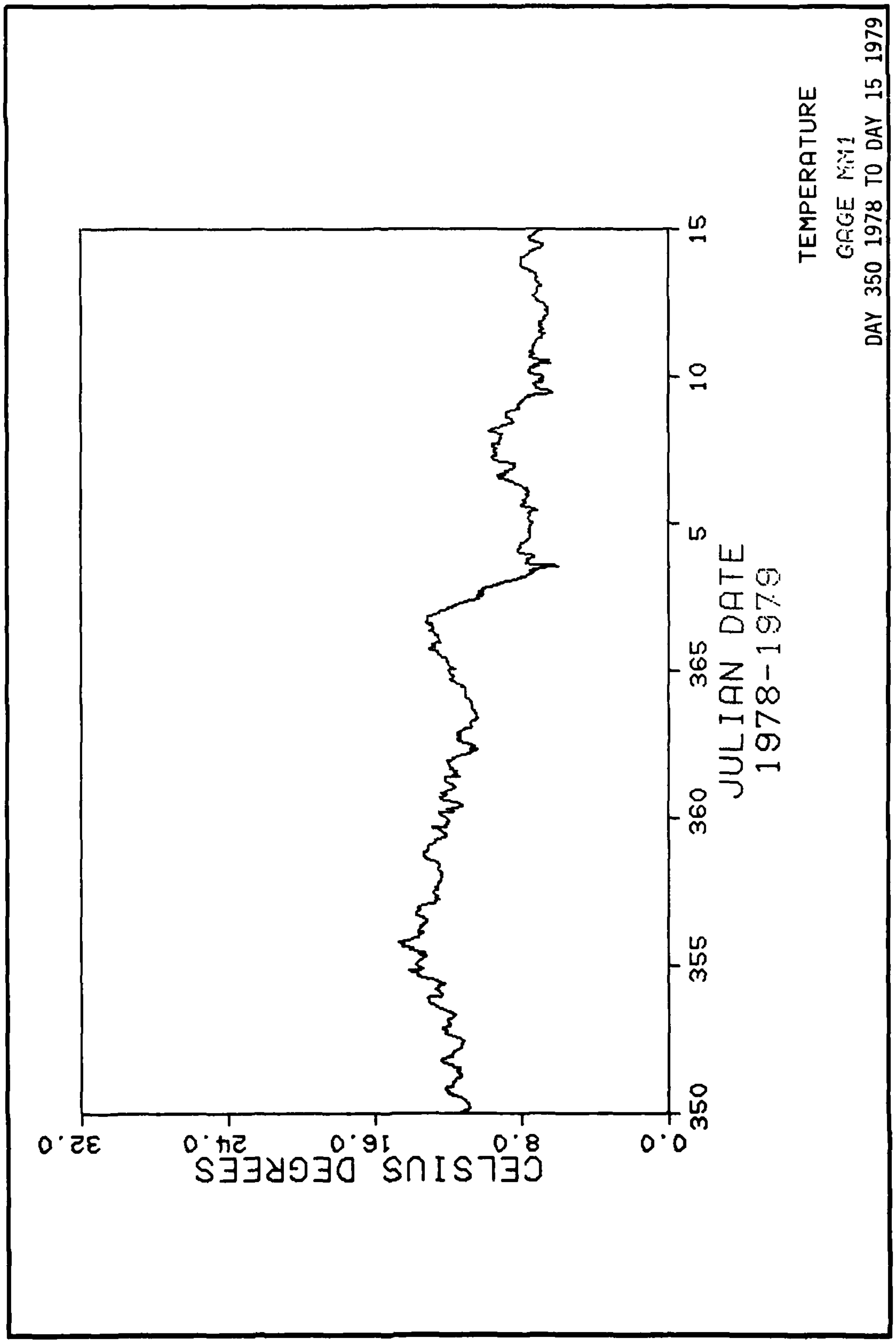
WIND DIRECTION
STATION WS-1
DAY 285 TO DAY 320 1978

PLATE 241



TEMPERATURE
GAGE MM1
DAY 320 TO DAY 350 1978
JULIAN DATE
1978
320
325
330
335
340
345
350
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0

PLATE 242



TEMPERATURE
GAGE MM1
DAY 350 1978 TO DAY 15 1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
JULIAN DATE
1978-1979
350
355
360
365
5
10
15

PLATE 243

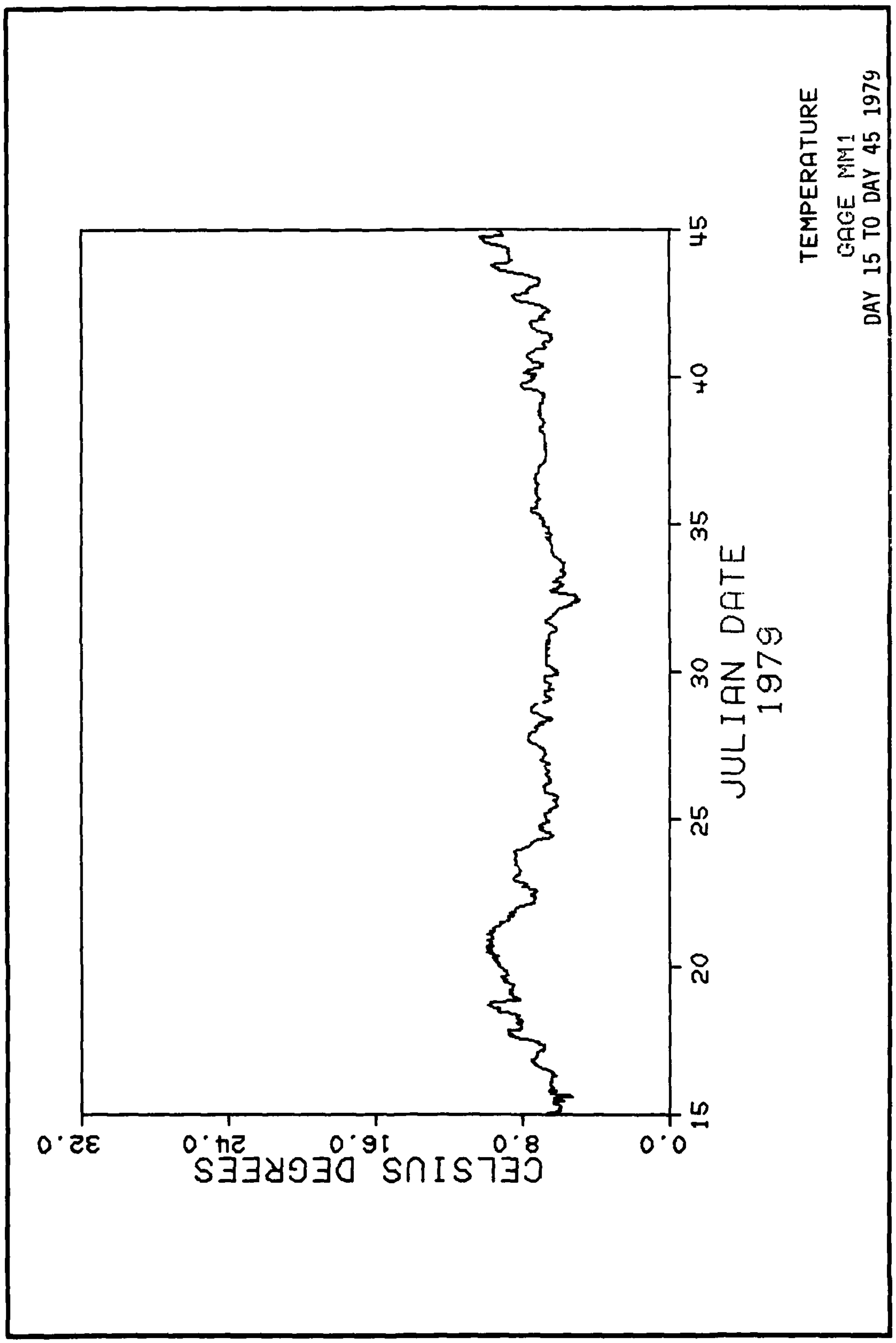

TEMPERATURE
GAGE MM1
DAY 15 TO DAY 45 1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
JULIAN DATE
1979
15
20
25
30
35
40
45

PLATE 244

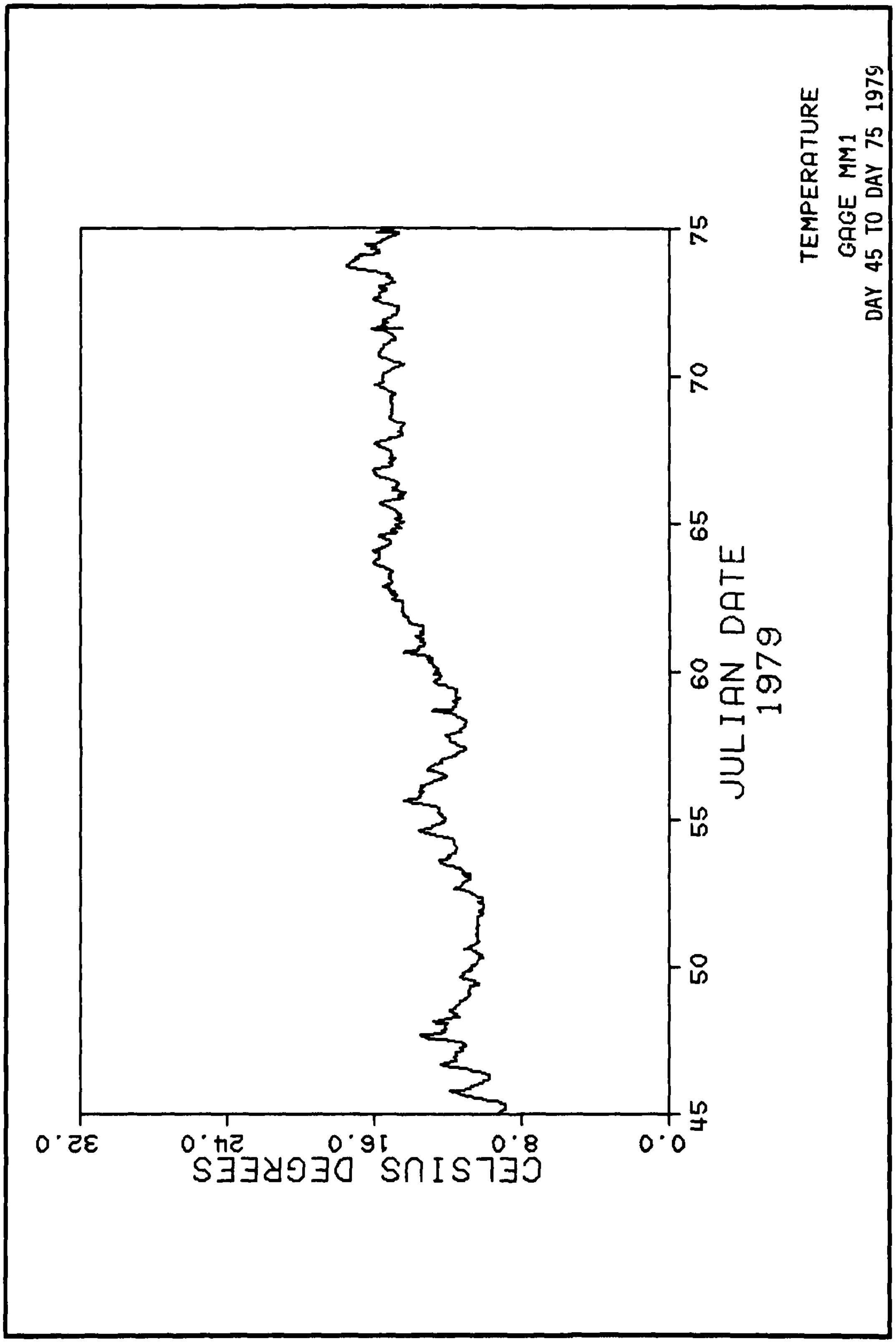

TEMPERATURE
GAGE MM1
DAY 45 TO DAY 75 1979
JULIAN DATE
1979
45
50
55
60
65
70
75
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0

PLATE 245

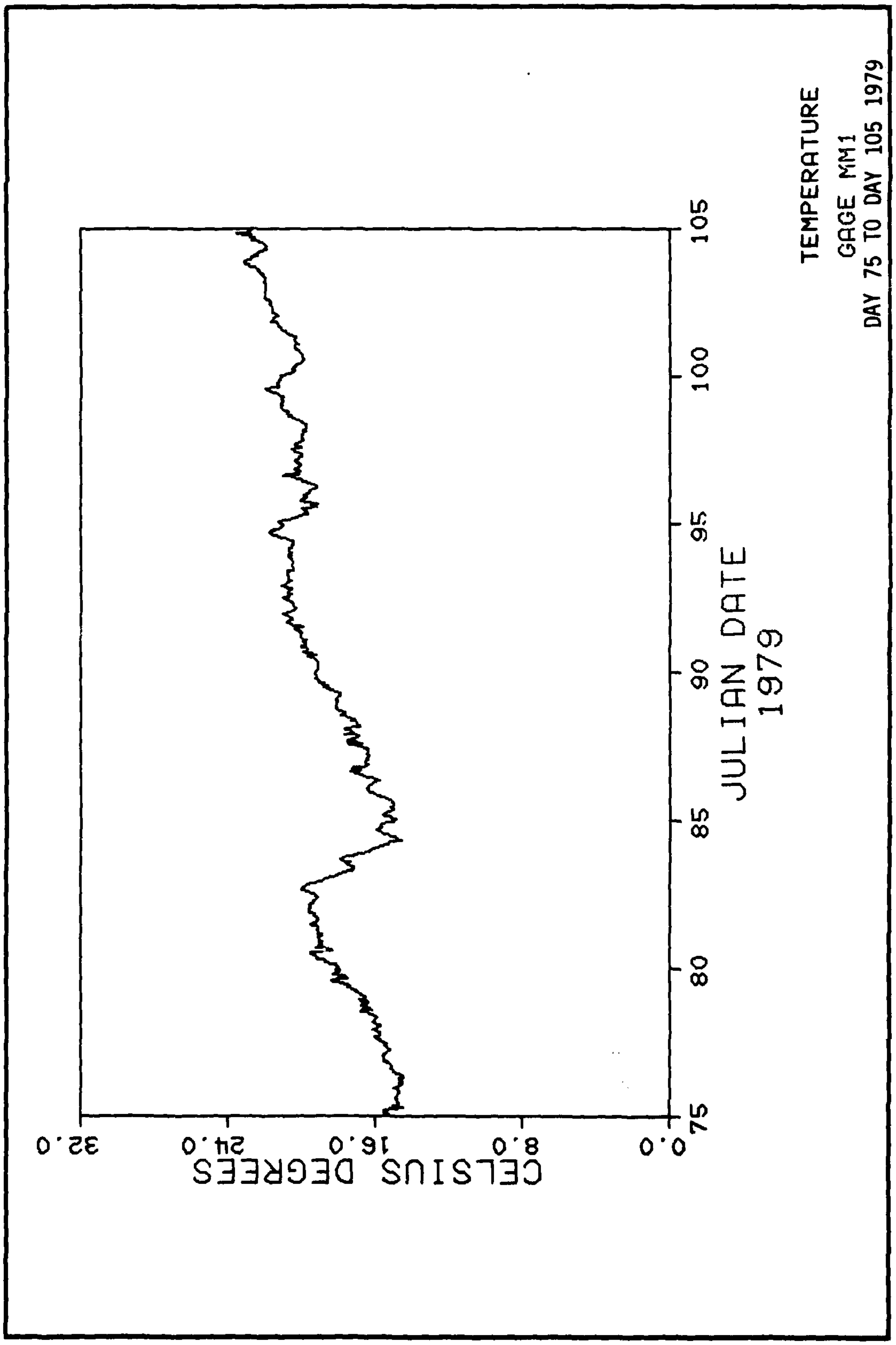

TEMPERATURE
GAGE MM1
DAY 75 TO DAY 105 1979
JULIAN DATE
1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
75
80
85
90
95
100
105

PLATE 246

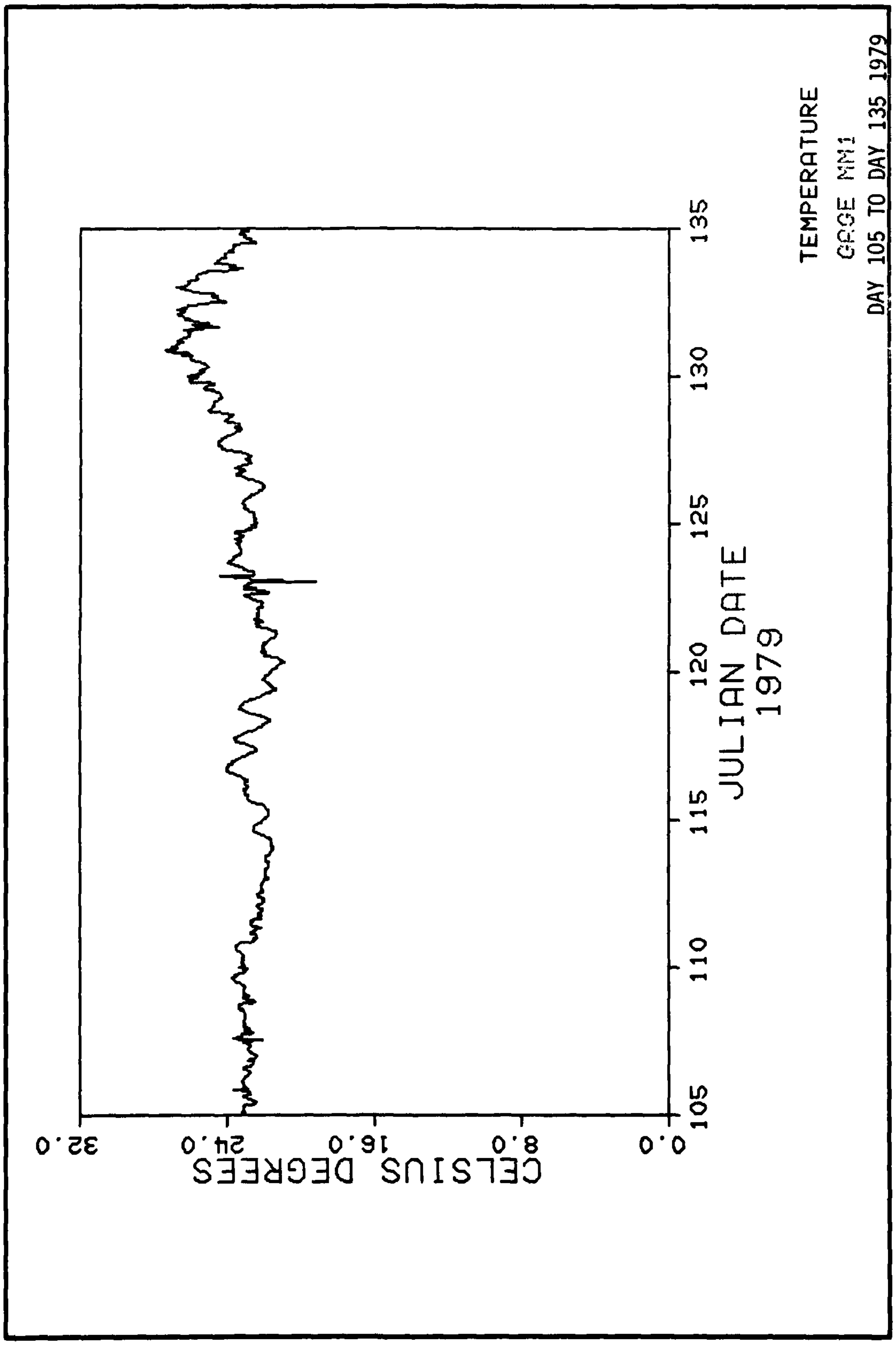

TEMPERATURE
GAGE MM1
DAY 105 TO DAY 135 1979
JULIAN DATE
1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
105
110
115
120
125
130
135

PLATE 247

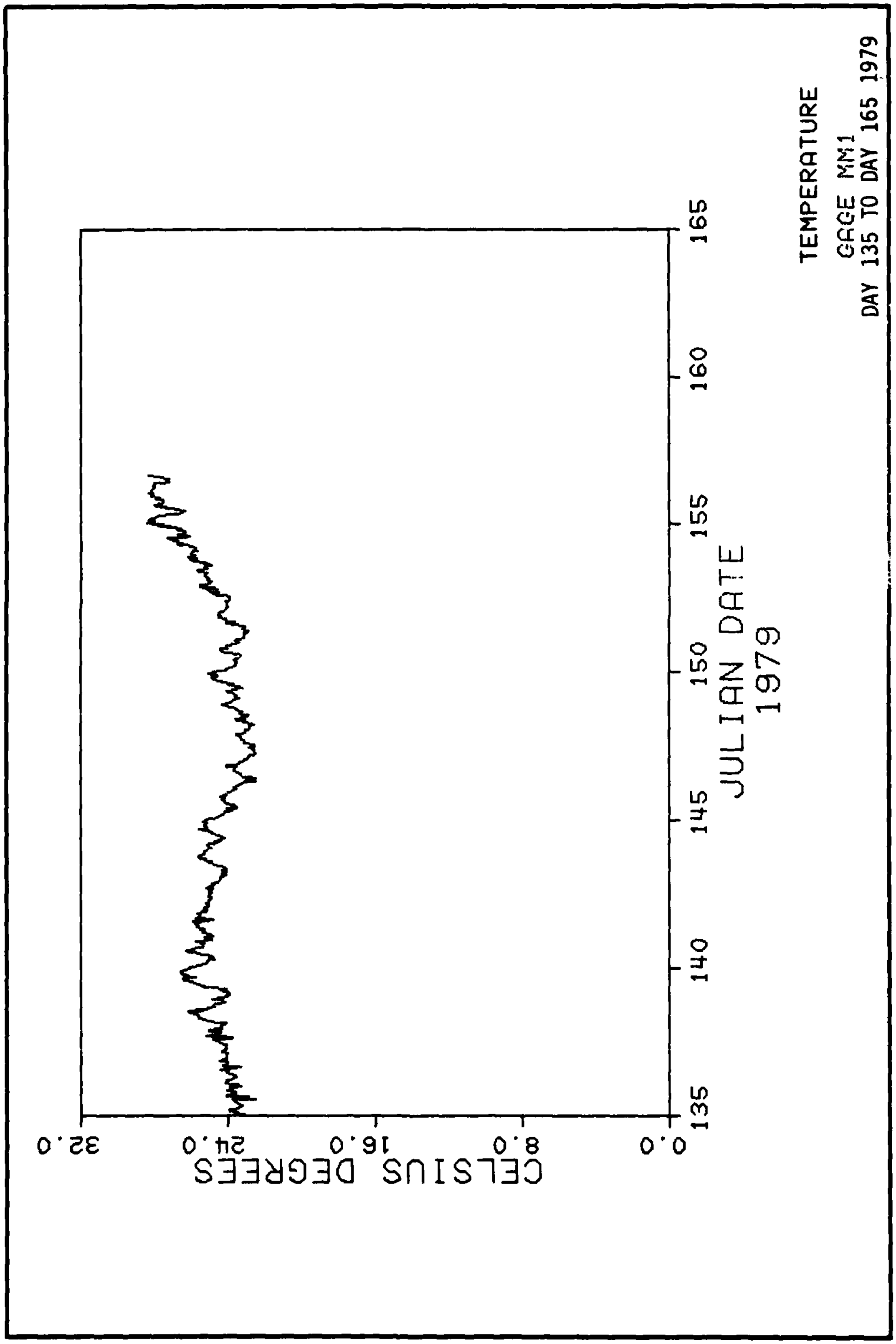
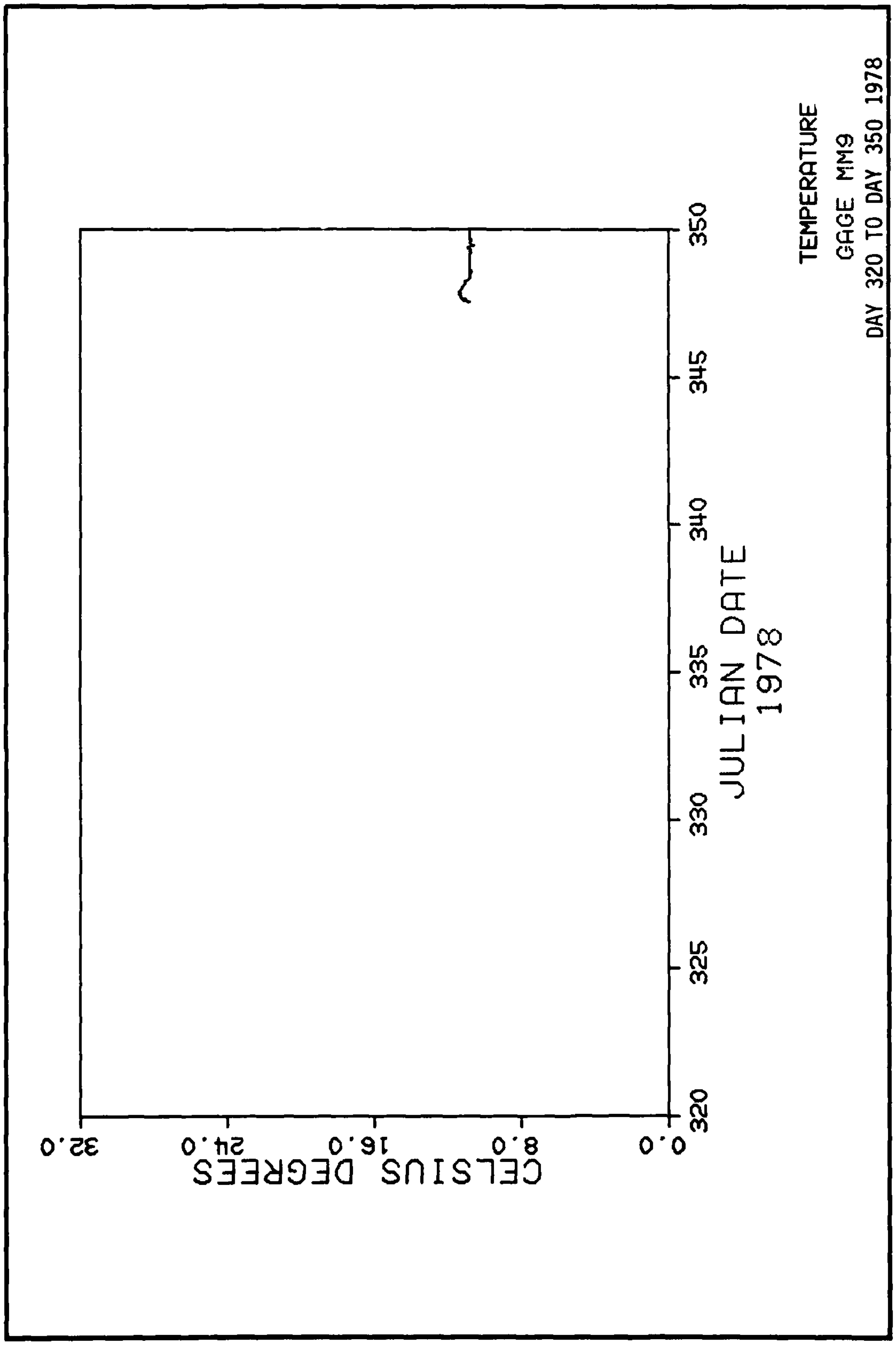

TEMPERATURE
GAGE MM1
DAY 135 TO DAY 165 1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
135
140
145
150
155
160
165
JULIAN DATE
1979

PLATE 248


TEMPERATURE
GAGE MM9
DAY 320 TO DAY 350 1978
JULIAN DATE
1978
320
325
330
335
340
345
350
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0

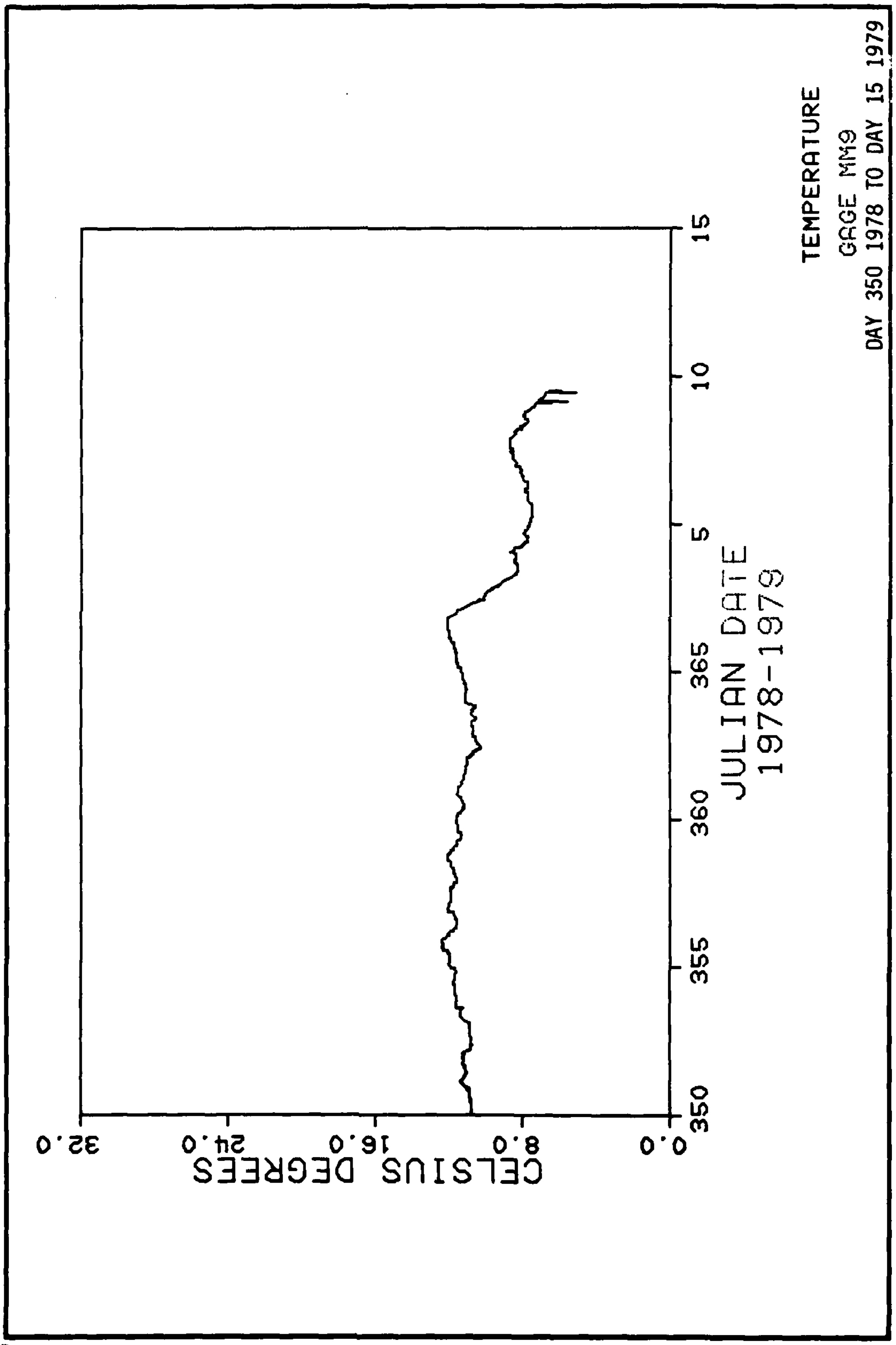
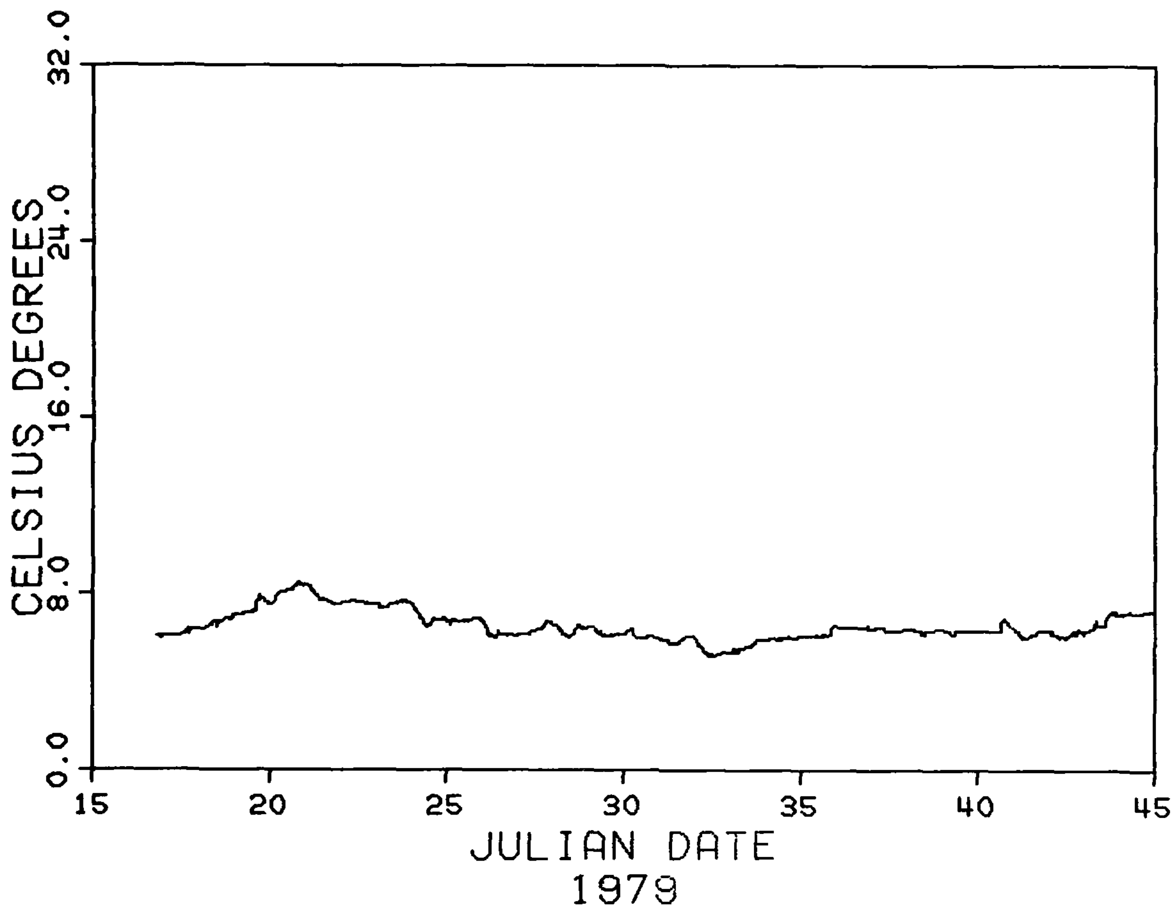

TEMPERATURE
GAGE MM9
DAY 350 1978 TO DAY 15 1979
JULIAN DATE
1978-1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
350
355
360
365
5
10
15

PLATE 250



TEMPERATURE
GAGE NM8
DAY 15 TO DAY 45 1979

PLATE 251

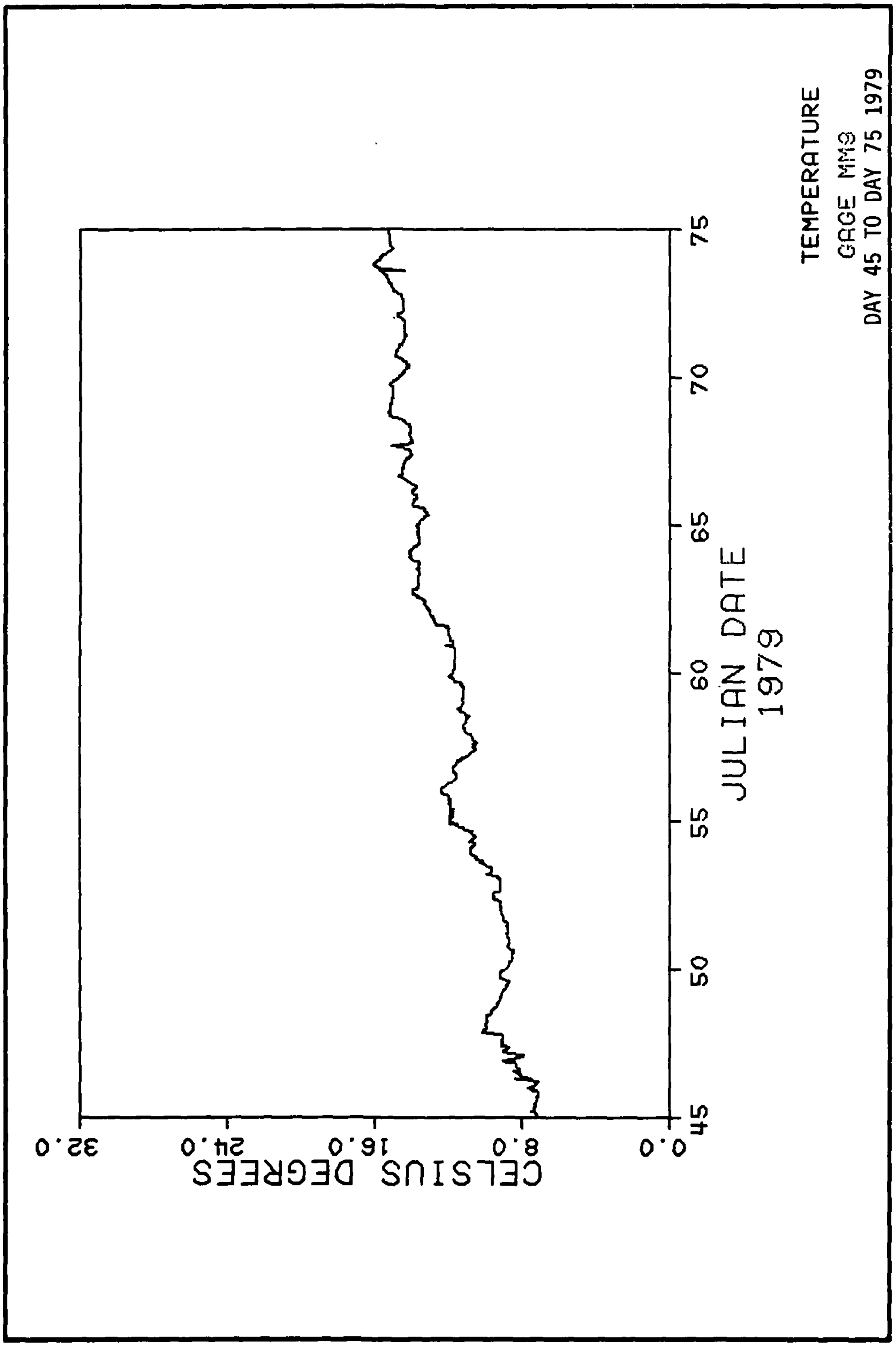
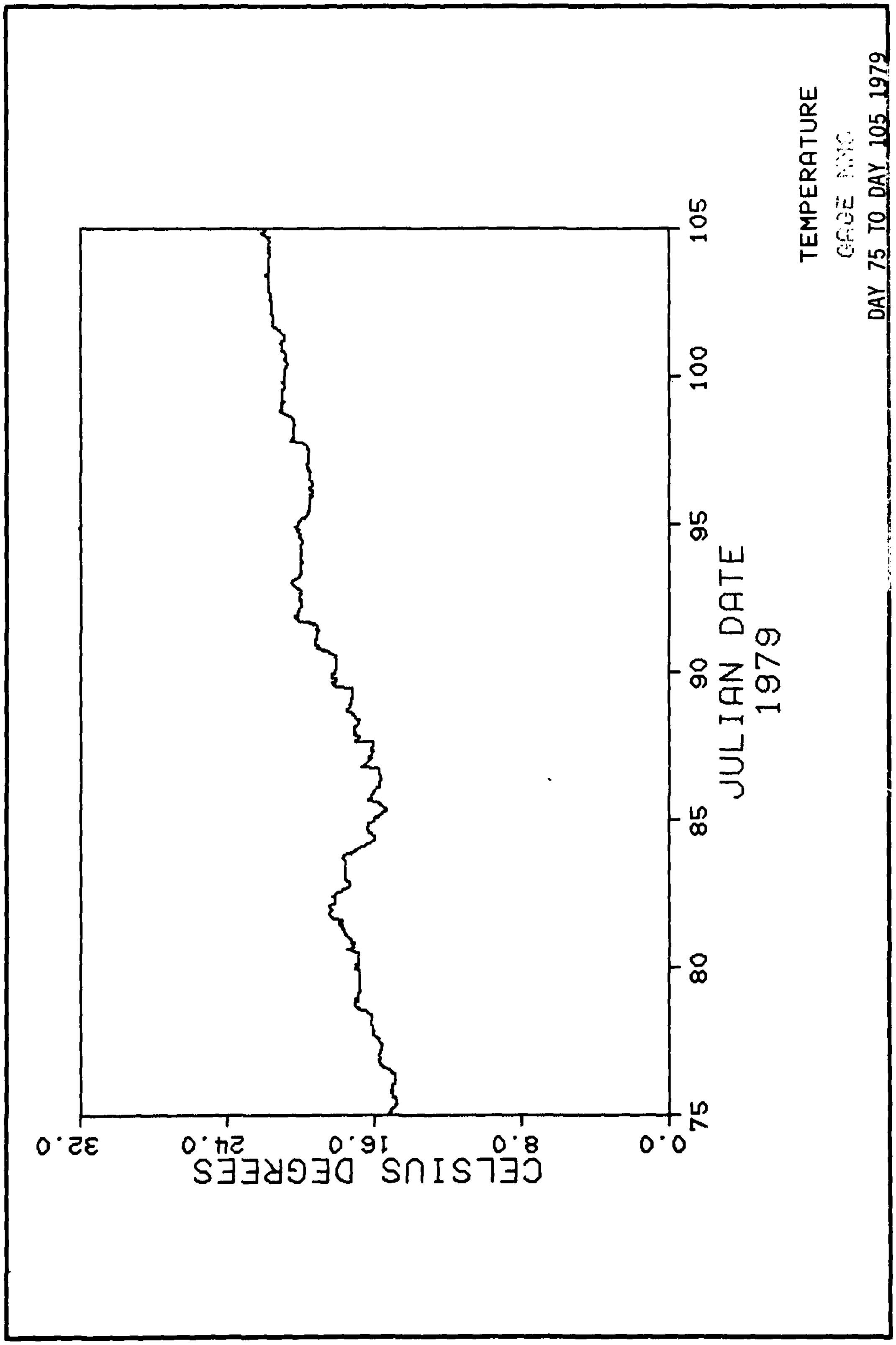

TEMPERATURE
GAGE MM9
DAY 45 TO DAY 75 1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
JULIAN DATE
1979
45
50
55
60
65
70
75

PLATE 252



TEMPERATURE
DAY 75 TO DAY 105 1979
JULIAN DATE
1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
75
80
85
90
95
100
105

PLATE 253

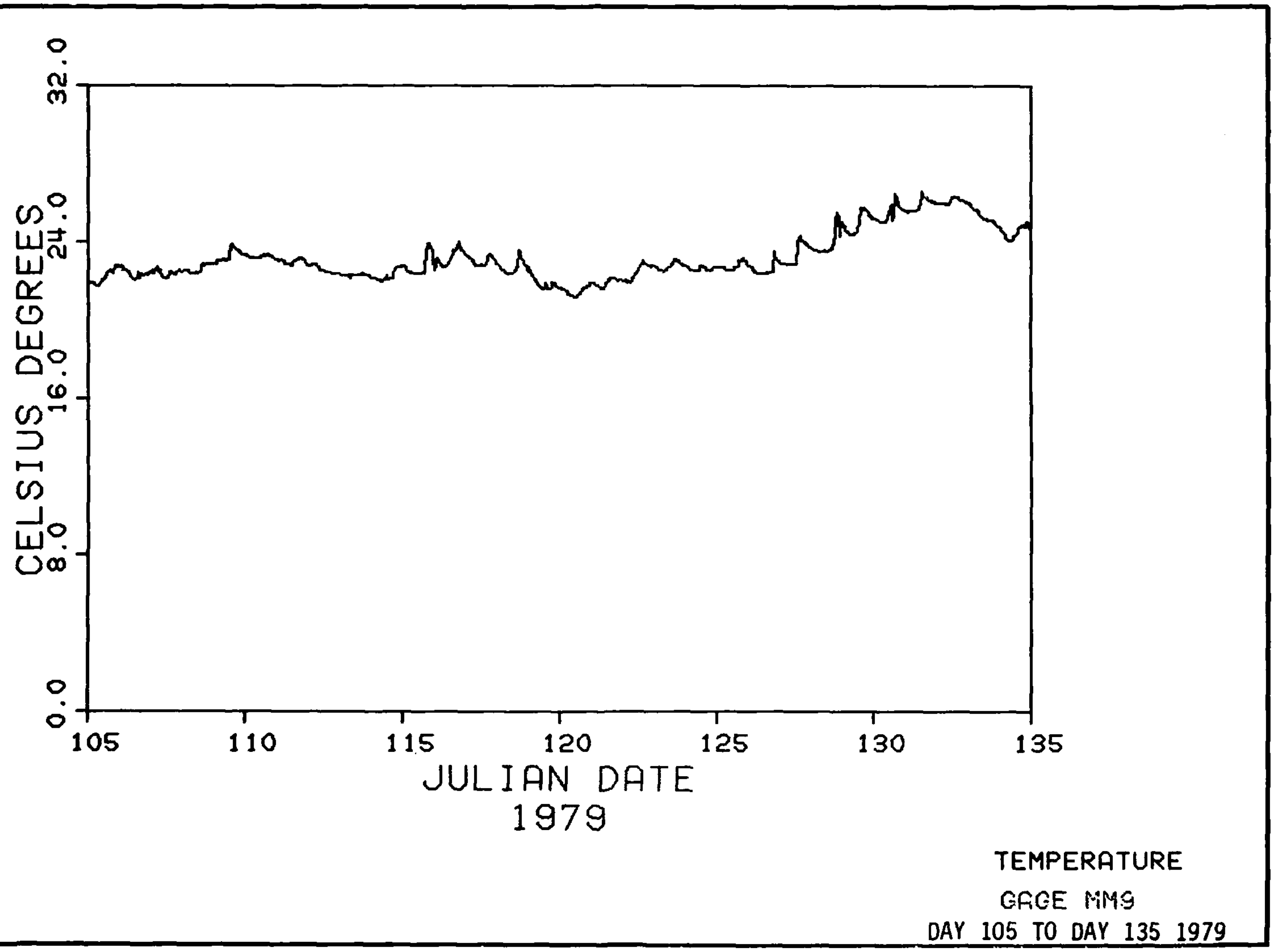
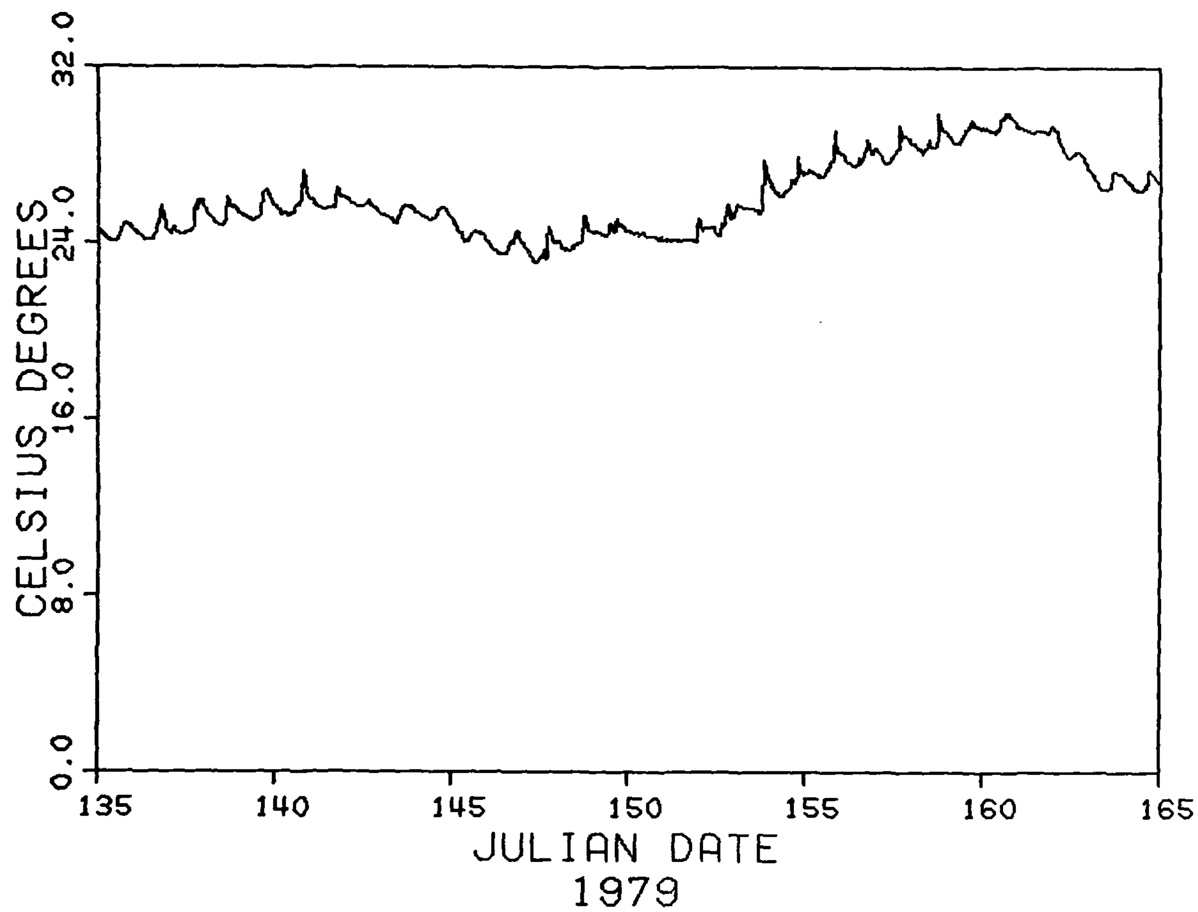

CELSIUS DEGREES
32.0
24.0
16.0
8.0
0.0
105
110
115
120
125
130
135
JULIAN DATE
1979
TEMPERATURE
GAGE MM9
DAY 105 TO DAY 135 1979

PLATE 254



TEMPERATURE
GAGE [illegible]
DAY 135 TO DAY 165 1979

PLATE 255

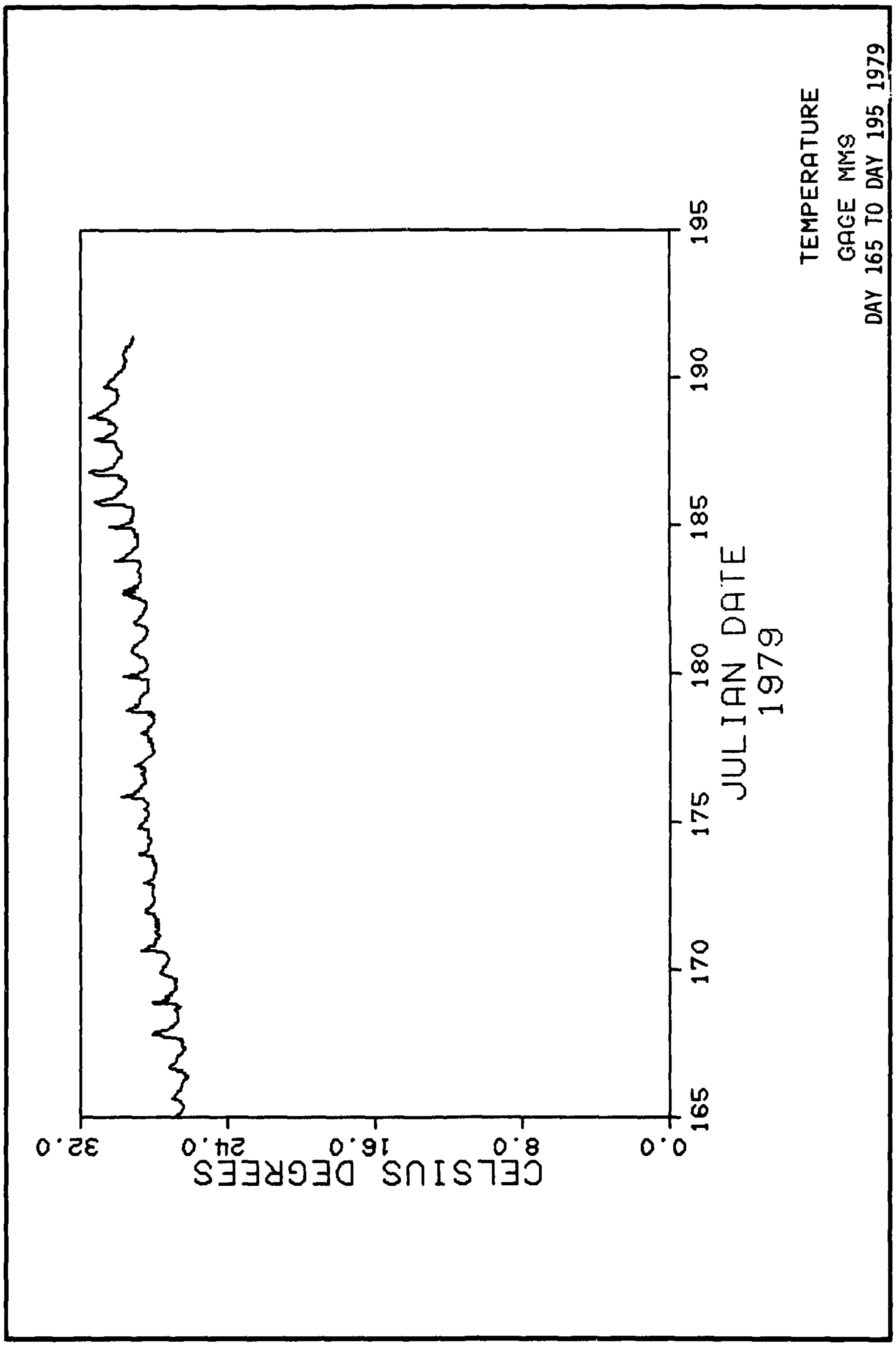
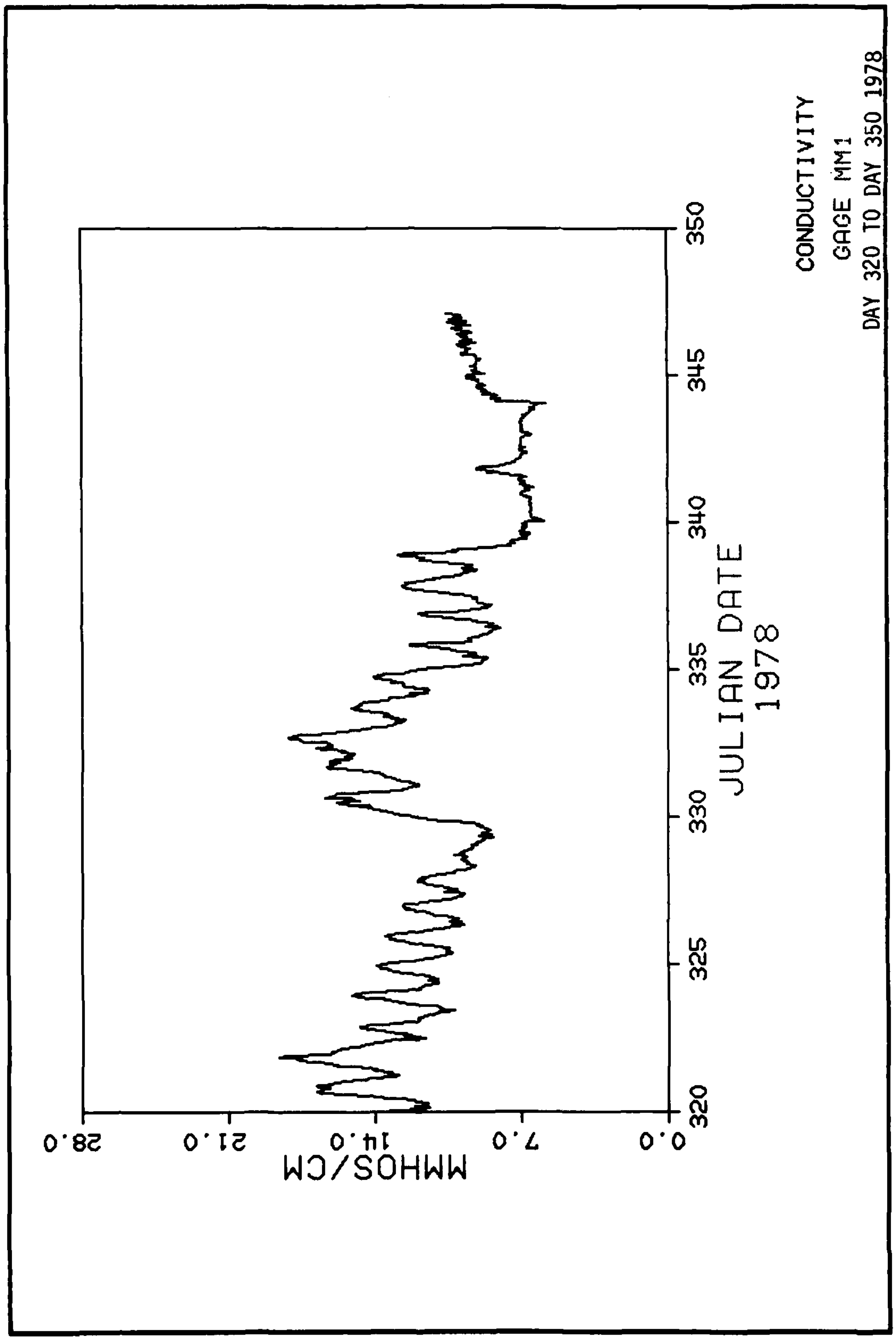

TEMPERATURE
GAGE MMS
DAY 165 TO DAY 195 1979
JULIAN DATE
1979
CELSIUS DEGREES
0.0
8.0
16.0
24.0
32.0
165
170
175
180
185
190
195

PLATE 256



CONDUCTIVITY
GAGE MM1
DAY 320 TO DAY 350 1978
JULIAN DATE
1978
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
320
325
330
335
340
345
350

PLATE 257

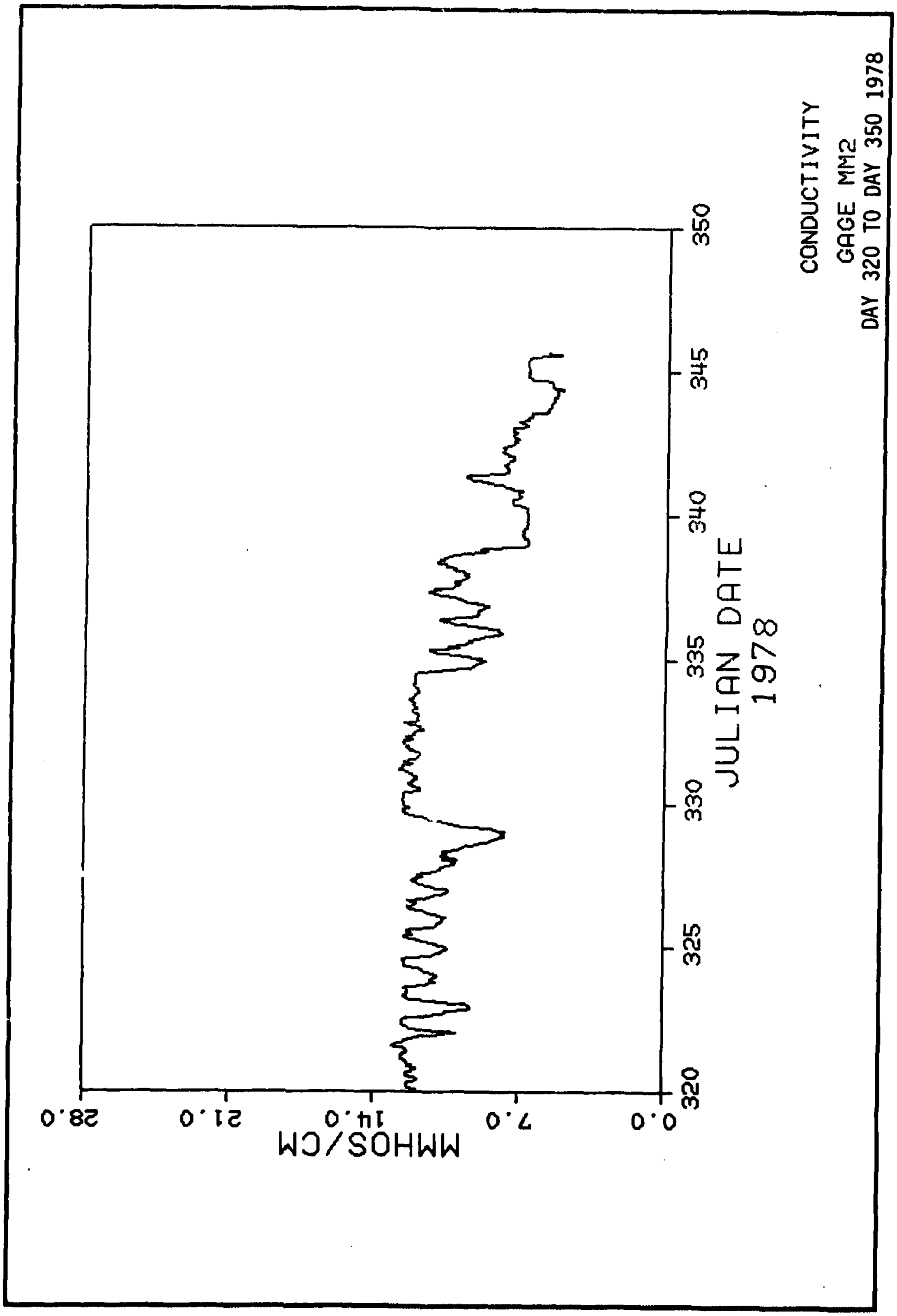
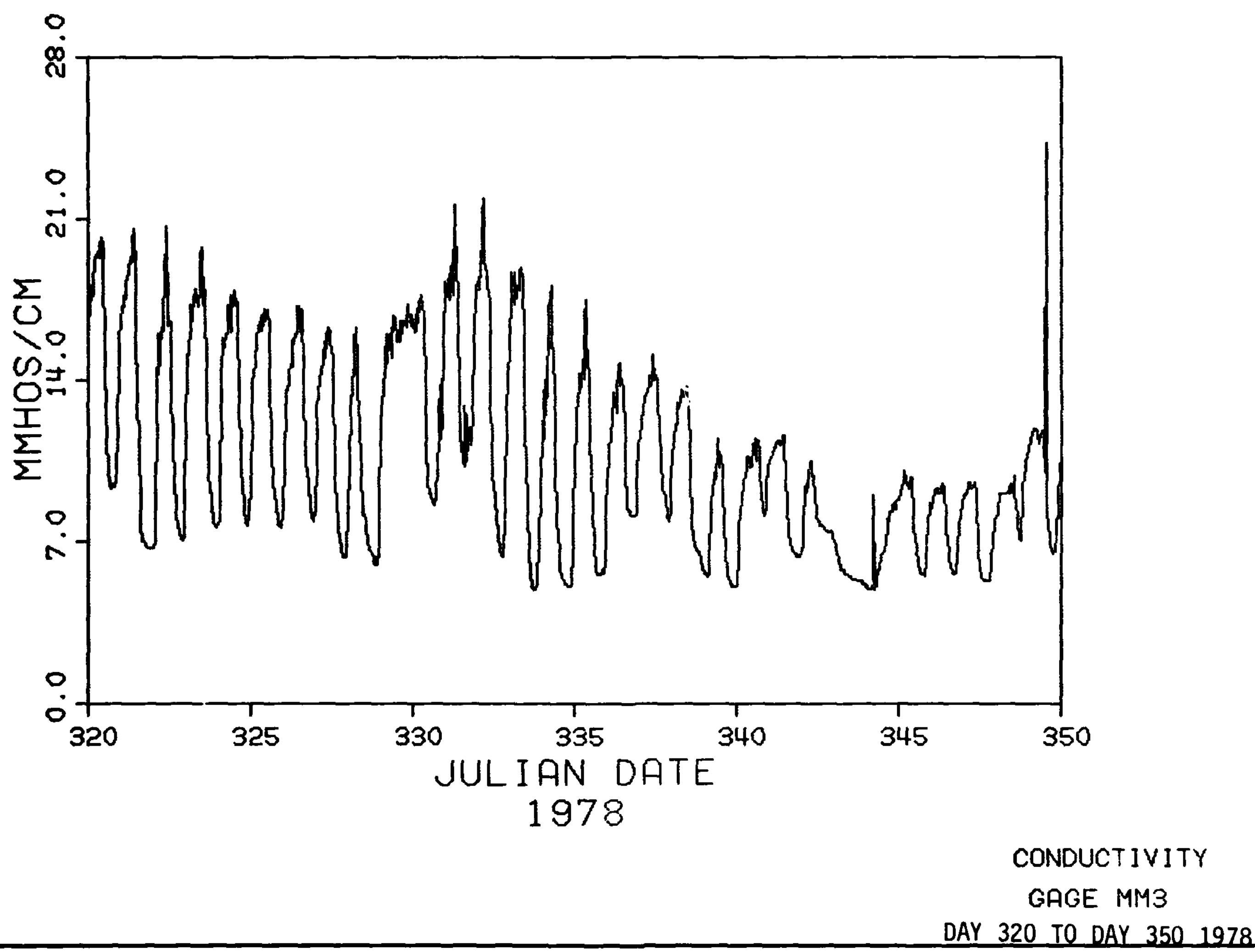

CONDUCTIVITY
GAGE MM2
DAY 320 TO DAY 350 1978
JULIAN DATE
1978
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
320
325
330
335
340
345
350

PLATE 258


28.0
21.0
14.0
7.0
0.0
MMHOS/CM
320
325
330
335
340
345
350
JULIAN DATE
1978
CONDUCTIVITY
GAGE MM3
DAY 320 TO DAY 350 1978

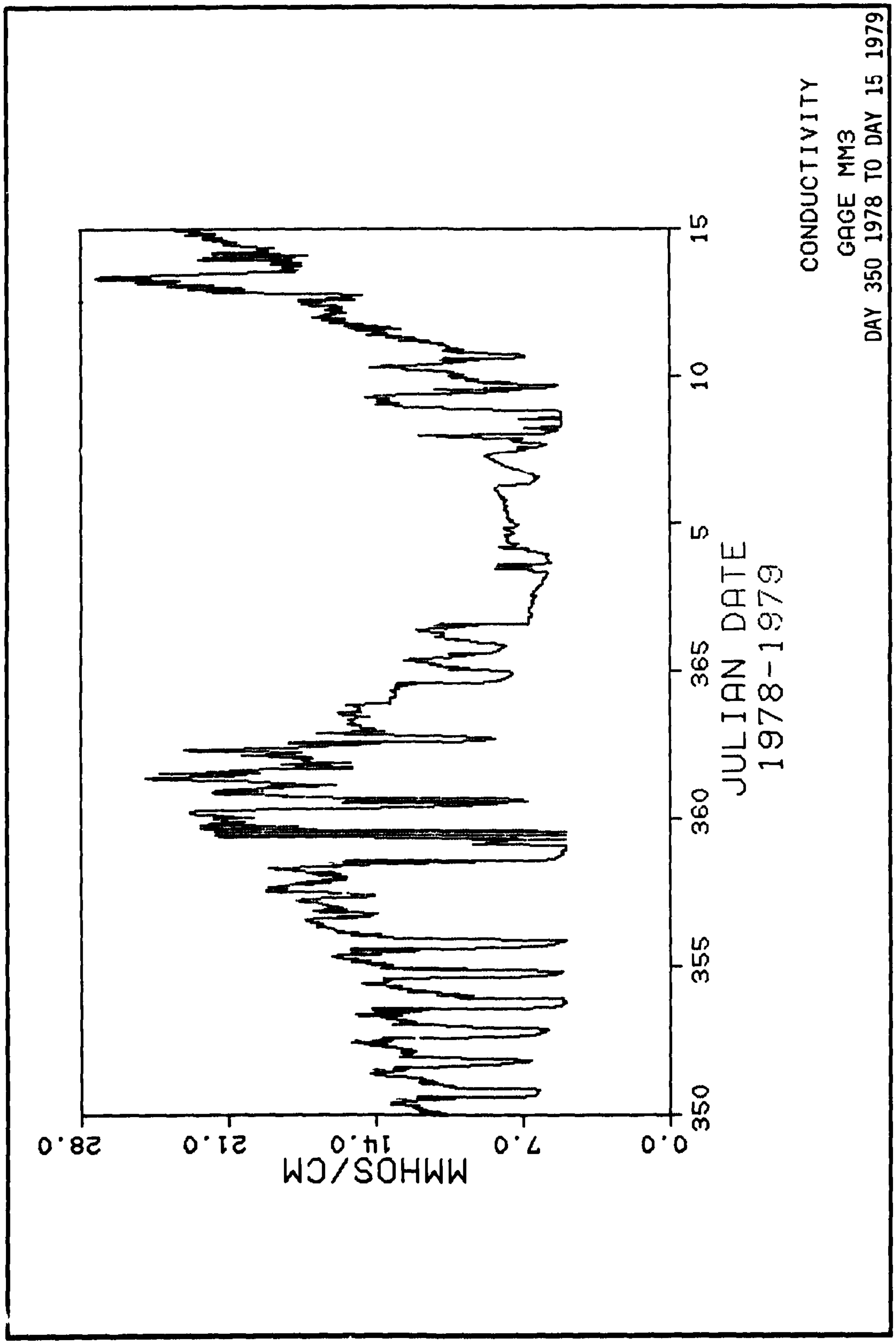
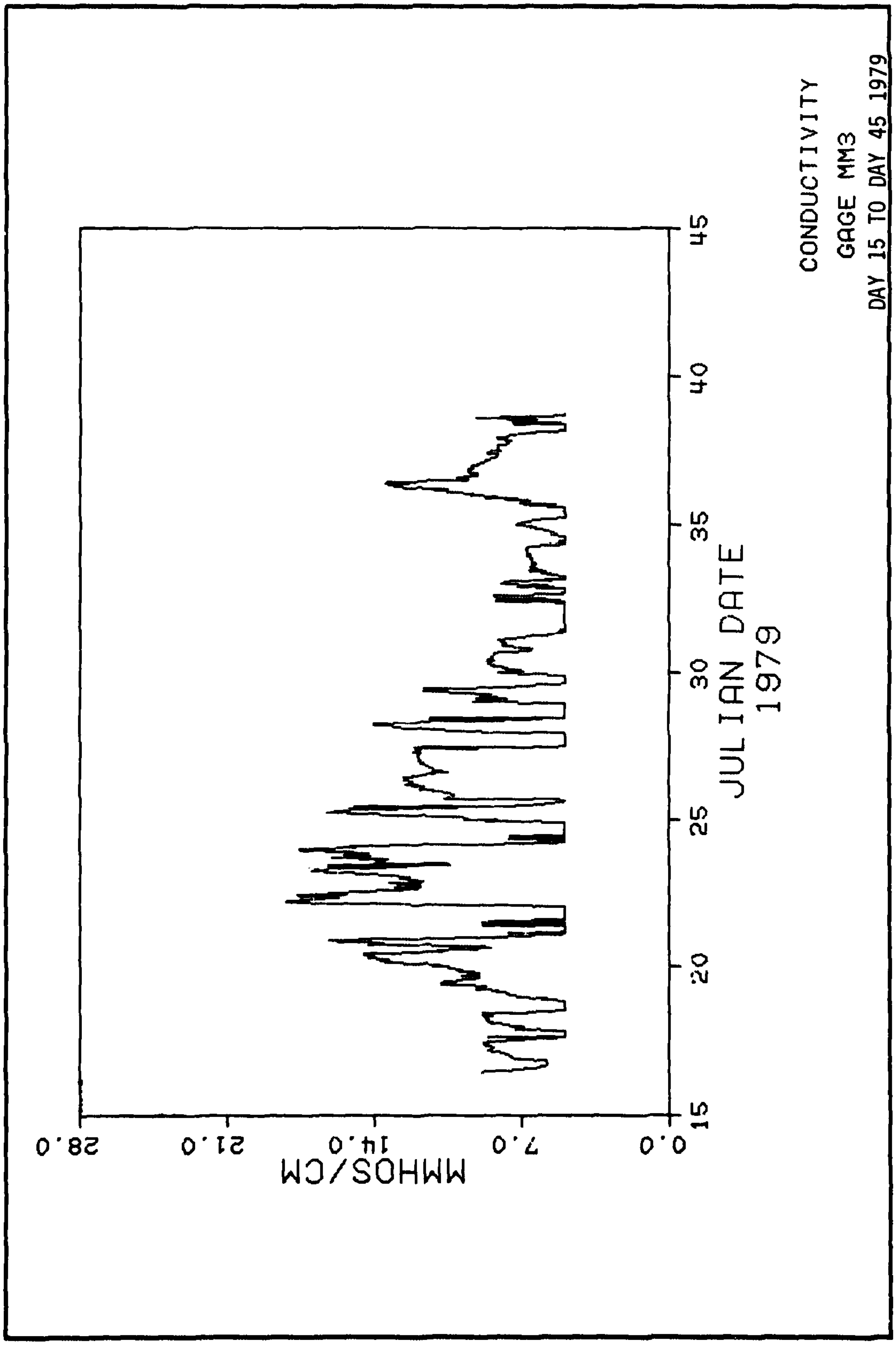
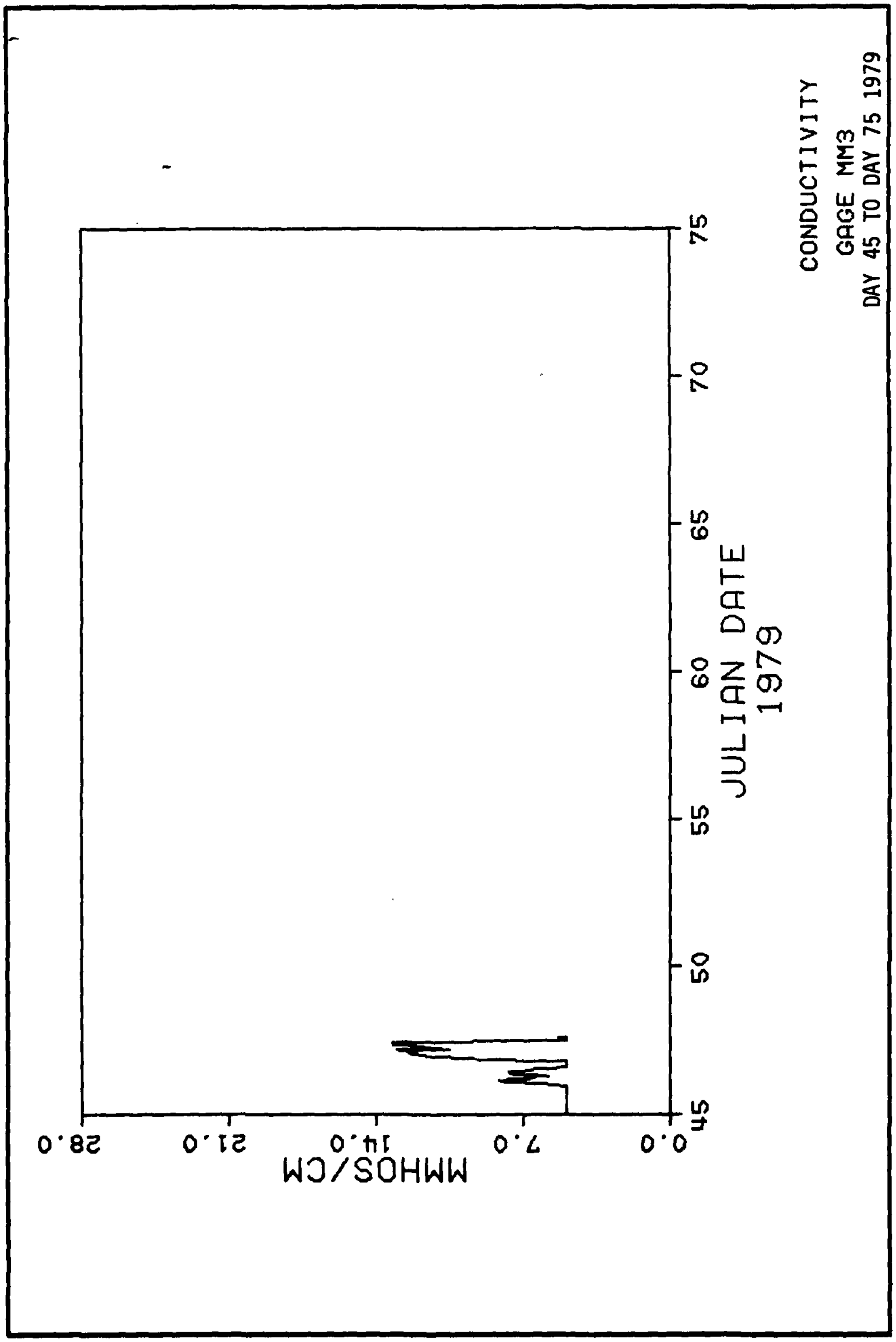

CONDUCTIVITY
GAGE MM3
DAY 350 1978 TO DAY 15 1979
JULIAN DATE
1978-1979
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
350
355
360
365
5
10
15

PLATE 260


CONDUCTIVITY
GAGE MM3
DAY 15 TO DAY 45 1979
JULIAN DATE
1979
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
15
20
25
30
35
40
45



CONDUCTIVITY
GAGE MM3
DAY 45 TO DAY 75 1979
MMHOS/CM
0.0
7.0
14.0
21.0
28.0
45
50
55
60
65
70
75
JULIAN DATE
1979

PLATE 262

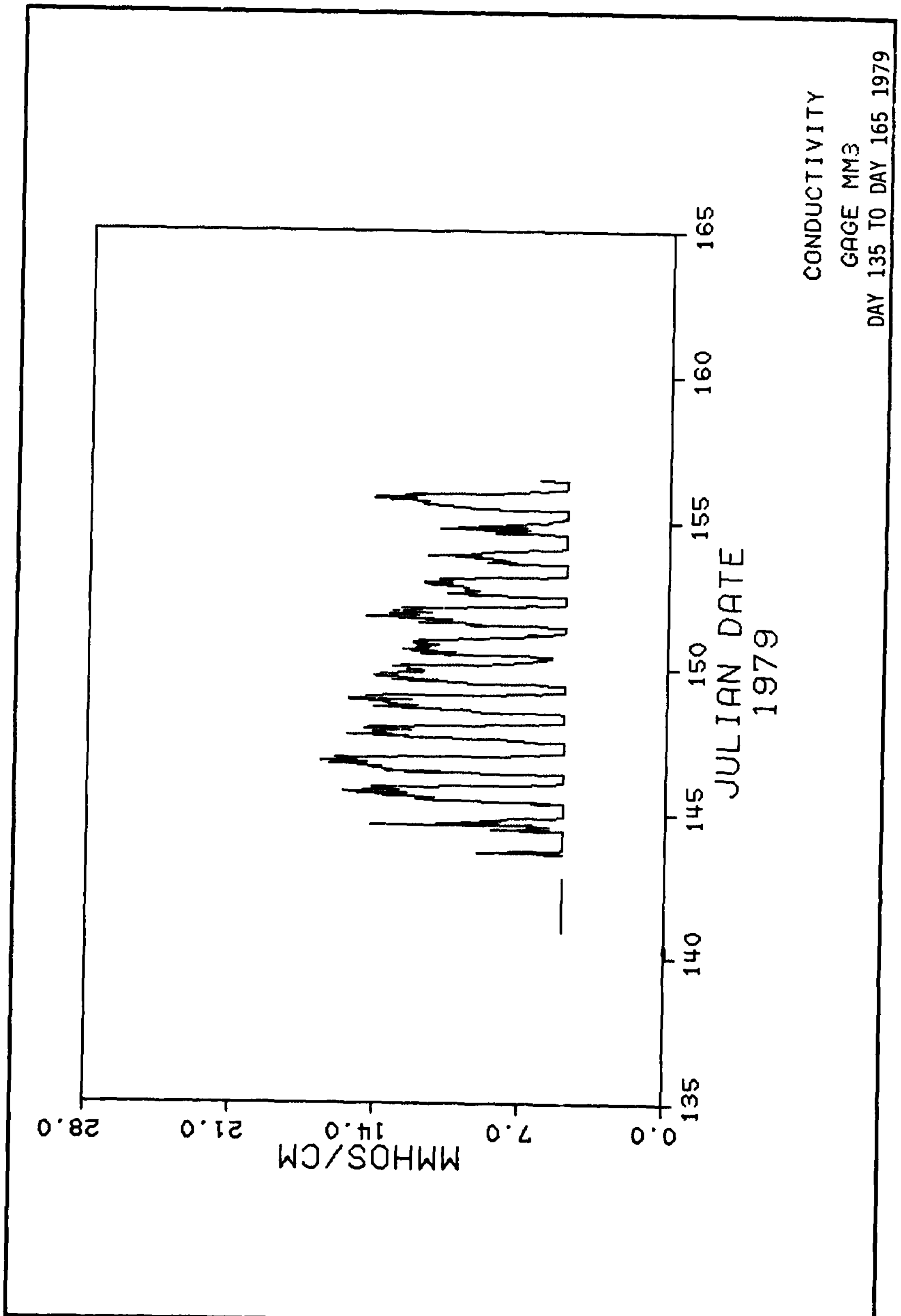

CONDUCTIVITY
GAGE MM3
DAY 135 TO DAY 165 1979
135
140
145
150
155
160
165
JULIAN DATE
1979
0.0
7.0
14.0
21.0
28.0
MMHOS/CM

PLATE 263

APPENDIX A: WATER QUALITY TRANSECT SURVEY DATA

Transect Survey Description

1. Water quality transect surveys were conducted in the study area during 12-16 October 1978 and 27-79 August 1979 by WES and LMN. The objects of the survey program were to:

   a. Test the assumption of vertical homogeneity of water quality constituents.

   b. Determine the frequency of occurrence and spatial distribution of anoxic bottom waters.

   c. Collect data for model calibration and verification if water quality modeling was determined to be necessary.

   d. Investigate seasonal variation in the measured water quality constituents.

Results of the surveys are described in detail in two memorandums for record (Hall 1979* and 1980**) and are summarized in this appendix along with a tabulation of the observed data.

2. The transect surveys included measurement of conductivity, temperature, dissolved oxygen (D.O.) and pH at 2 ft below the surface, at middepth, and at 2 ft above the bottom. Station locations along the 17 transect ranges are shown in Plate A1. The transect ranges were selected such that:

   a. The end points of the transect should correspond to land features recognizable on maps and in the field.

   b. Coverage should be sufficient to permit the characterization of possible horizontal gradients in both Lakes Pontchartrain and Borgne.

   c. The transects should be positioned in the lake to allow more intensive sampling near The Rigolets and Chef Menteur Passes and near the Inner Harbor Canal.

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* R. W. Hall. 1979 (Jul). "Lake Pontchartrain Water Quality Transect Survey," Memorandum for Record (unpublished), U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

** R. W. Hall. 1980 (Dec). "Second Lake Pontchartrain Water Quality Transect Survey," Memorandum for Record (unpublished), U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

The August 1979 survey included Ranges 2, 5, 7, 8, 12, 14, and 15 in Lake Pontchartrain to provide data representative of seasonal variations during a period of expected maximum thermal stratification. The water quality measurements were made with Hydrolab Surveyor Model 6D In-situ Water Quality Analyzer. Transect sampling was done from one boat and covering the ranges in one pass during each sampling period.

3. Results (Hall 1979 and 1980) from the two transect surveys are presented in Tables A1 and A2 for each range included in the survey. The tables also give the latitude and longitude of each station, date and time of observation, total water depth, and depth of each observation. The water quality measurements given in Tables A1 and A2 are the measurements as recorded during the survey. The D.O. values in the table are not corrected for conductivity effects. At the observed temperature over the 1,390 to 15,500 micromhos/cm conductivity range, the measured D.O. values would be 0 to 5 percent greater than corrected values. Conductivity values in the tables are the observed values at the observed temperature and have not been converted to a conductivity at a standard temperature.

4. As can be noted in the tables, water quality data were not observed at all stations. Only the stations sampled are shown in Plate A1. The following tabulation shows three pairs of station numbers which were actually at the same location. These locations were at transect intersections and were monitored once only as the survey boat changed transects at separate times:

Initial Station		Corresponding Station	
Range	Station	Range	Station
2	6	5	0
2	6	5	0
15	7	17	8

Results and Conclusions

5. Conclusions (Hall 1979) fron the initial transect survey were:

a. Conductivity varied between 1,390 and 15,100 micromhos/cm with a mean value of 6,340 micromhos/cm. The conductivity

values reflected the northwest-southeast gradient between freshwater inputs in the north and west and saline inputs from the Industrial Canal and Lake Borgne.

b. D.O. values averaged greater than saturation in the surface waters and averaged near 95 percent saturation near the bottom. The low D.O. observed near the bottom at sta 2-1 may represent inflow of anoxic waters through the Industrial Canal.

c. Mean temperature closely approximated the expected seasonal value. Variation within days probably reflected diurnal variation in short wave radiation while variation among days probably reflected the passage of a synoptic weather front of 14 October with accompanying strong and cool winds.

d. The range of pH between 6.8 and 7.9 was within limits established by the State of Louisiana for Lakes Pontchartrain and Borgne.

e. Little vertical variation in observed water quality constituents was found during the transect survey period.

The vertical variation in conductivity and D.O. at sta 2-1 (probably related to quality of water entering from the Industrial Canal) and D.O. over the southern half of range 12 were larger than at other stations.

6. Conclusions (Hall 1979) from the second transect survey were:

a. Conductivity varied between 1,500 and 1,200 micromhos/cm with a mean value of 5,010 micromhos/cm. The conductivity values again reflected the northwest-southeast gradient between freshwater inputs in the north and west and saline inputs from the Industrial Canal and Lake Borgne.

b. D.O. averaged 95 percent saturation in the surface waters and 87 percent saturation near the bottom. The minimum measured D.O. concentration of 4.6 mg/ℓ at 28.5°C (at sta 12-12) represents 60 percent saturation. No D.O. measurement violated standards established by the State of Louisiana for Lake Pontchartrain.

c. Mean temperature approximated the expected seasonal value.

d. The range of pH between 7.1 and 8.4 is within limits established by the State of Louisiana for Lake Pontchartrain.

e. Little vertical variation in water quality constituents was found during the second transect survey period.

6. The composite mean value averages of all observations for the observed water quality parameters in Tables A3 and A4 show a decrease

in conductivity during the August 1979 survey from 6,340 to 5,010 micromhos/cm in comparison with the October 1978 survey data. The composite mean pH changed from 7.9 to 7.8, the D.O. decreased from 8.7 to 7.0 mg/ℓ, and the temperature increased from 20.0°C to 28.8°C.

TABLE A1

LAKE PONTCHARTRAIN TRANSECT SURVEY, OCTOBER 1978

RANGE/ STAT	LAT			LONG			DATE	TIME	TOTAL DEPTH (FT)	SUR DEPTH (FT)	COND	PH	DO	TEMP	MID DEPTH (FT)	COND	PH	DO	TEMP	BOT DEPTH (FT)	COND	PH	DO	TEMP
1- 1	90	3	34	30	2	1	12-10-78	1040	15.0	2.0	7800.	8.0	8.4	22.8	7.5	8000.	7.9	8.0	22.6	13.0	9200.	7.6	7.1	22.1
1- 2	90	4	0	30	2	27	12-10-78	1135	15.0	2.0	4900.	8.2	9.0	22.8	7.5	5200.	8.1	8.9	22.7	13.0	5500.	8.1	8.6	22.5
1- 4	90	7	17	30	3	17	15-10-78	1112	11.0	2.0	5830.	7.6	7.8	20.8	5.5	5840.	7.6	7.7	20.6	9.0	5890.	7.7	7.7	20.6
1- 5	90	8	56	30	3	44	15-10-78	1131	14.0	2.0	5480.	7.7	7.8	20.7	7.0	5460.	7.6	7.6	20.6	12.0	5450.	7.6	7.6	20.6
2- 1	90	3	14	30	3	33	12-10-78	1321	23.5	2.0	7760.	8.2	9.1	23.0	11.7	8160.	8.1	8.9	23.0	21.5	12200.	7.3	4.3	23.5
2- 2	90	3	31	30	5	5	12-10-78	1339	10.0	2.0	5380.	8.1	8.7	23.3	5.0	5540.	8.1	8.8	23.3	8.0	5620.	8.1	8.8	23.2
2- 3	90	5	2	30	6	36	12-10-78	1410	10.0	2.0	7020.	8.3	8.9	23.5	5.0	7040.	8.3	8.8	23.4	8.0	7020.	8.2	8.7	23.3
2- 4	90	5	58	30	8	7	12-10-78	1427	10.5	2.0	6920.	8.3	8.0	23.0	5.3	6960.	8.3	8.0	23.5	8.5	6840.	8.3	7.9	23.0
2- 5	90	6	51	30	9	39	12-10-78	1444	13.0	2.0	6540.	8.2	8.6	23.0	6.5	6440.	8.2	8.6	23.0	11.0	6460.	8.1	8.4	23.0
2- 6	90	7	45	30	11	1'	12-10-78	1457	16.5	2.0	6000.	8.3	8.8	23.0	8.2	6040.	8.3	8.7	23.0	14.5	6080.	8.2	8.4	23.0
3- 2	90	1	47	30	3	52	15-10-78	1729	13.0	2.0	7420.	8.0	9.3	21.8	6.5	7620.	7.9	9.0	21.7	11.0	7720.	7.6	8.0	21.1
3- 3	90	1	14	30	5	2	15-10-78	1721	16.5	2.0	7400.	7.9	9.0	21.0	8.3	7800.	7.8	8.6	20.5	15.0	8160.	7.9	9.0	20.7
3- 4	90	0	41	30	6	32	15-10-78	1703	17.0	2.0	8140.	8.2	9.5	21.7	8.5	8160.	7.9	9.0	21.0	15.0	8200.	7.8	8.2	20.5
3- 5	90	0	0	30	8	2	15-10-78	1645	16.5	2.0	7500.	8.1	9.3	21.3	8.3	7640.	8.0	9.2	21.0	14.5	7960.	7.8	8.2	20.8
3- 6	89	59	35	30	9	32	15-10-78	1630	16.0	2.0	7060.	8.1	9.1	21.5	8.0	6640.	8.0	8.7	20.6	14.0	6820.	7.8	8.3	20.6
3- 7	89	59	2	30	11	3	15-10-78	1333	15.5	2.0	6800.	8.1	9.1	21.8	7.8	6960.	8.0	8.9	21.0	13.5	7060.	7.9	9.0	20.5
3- 8	89	58	29	30	12	33	15-10-78	1345	16.5	2.0	6000.	8.1	9.0	21.0	8.3	5860.	8.0	8.8	20.5	14.5	6280.	7.9	8.3	20.0
3- 9	89	57	57	30	14	3	15-10-78	1405	13.5	2.0	5000.	8.1	9.0	21.0	6.8	5200.	8.2	9.0	21.0	11.5	5740.	7.9	8.3	20.5
4- 3	90	0	7	30	4	42	12-10-78	1830	17.0	2.0	6860.	8.2	9.1	22.9	8.5	6980.	8.2	9.1	23.0	15.0	7020.	8.2	9.0	23.0
4- 4	89	59	0	30	6	3	12-10-78	1807	19.0	2.0	6820.	8.1	8.7	22.5	9.5	6840.	8.1	8.7	22.5	17.0	6920.	8.0	8.4	22.5
4- 5	89	57	53	30	7	13	12-10-78	1743	18.0	2.0	6160.	8.0	8.7	22.5	9.0	6100.	7.9	8.7	22.5	16.0	6300.	7.9	8.6	22.5
4- 6	89	56	47	30	8	43	15-10-78	1603	15.5	2.0	6180.	8.0	9.2	21.0	7.8	6180.	7.7	8.5	20.0	13.5	6240.	7.8	8.3	20.0
4- 7	89	55	41	30	10	4	15-10-78	1546	15.0	2.0	5160.	8.0	9.1	20.5	7.5	5360.	7.7	8.7	20.0	13.0	5500.	7.6	8.3	20.0
4- 8	89	54	34	30	11	24	15-10-78	1526	12.0	2.0	5060.	8.0	8.6	20.9	6.0	5060.	8.0	8.6	20.7	10.0	5320.	7.7	8.0	20.0
4- 9	89	53	27	30	12	44	15-10-78	1508	12.0	2.0	4700.	8.0	8.9	20.5	6.0	4740.	8.0	8.9	20.5	10.0	4840.	7.7	8.2	20.0

(CONTINUED)

TABLE A1 (CONTINUED)

RANGE/ STAT	LAT	LONG	DATE	TIME	TOTAL DEPTH (FT)	SUR DEPTH (FT)	COND	PH	DO	TEMP	MID DEPTH (FT)	COND	PH	DO	TEMP	BOT DEPTH (FT)	COND	PH	DO	TEMP
4-10	89 52 20	30 14 4	15-10-78	1445	9.5	2.0	5440.	7.8	8.6	20.5	4.0	5440.	7.8	8.6	20.5	7.5	5500.	7.8	8.6	20.5
5- 0	90 7 45	30 11 11	12-10-78	1457	16.5	2.0	6000.	8.3	8.8	23.0	8.2	6040.	8.3	8.7	23.0	14.5	6080.	8.2	8.4	23.0
5- 1	90 5 48	30 10 59	12-10-78	1510	22.0	2.0	6340.	8.3	8.4	23.1	11.0	6340.	8.2	8.3	22.8	20.0	6340.	8.1	7.5	22.4
5- 2	90 3 51	30 10 48	12-10-78	1542	21.0	2.0	5960.	8.3	8.9	22.9	10.5	5960.	8.2	8.8	22.8	19.0	6180.	8.0	7.9	22.4
5- 3	90 1 54	30 10 37	12-10-78	1605	20.0	2.0	5540.	8.4	9.0	23.0	10.0	5500.	8.3	8.9	23.0	18.0	5640.	8.1	8.6	22.5
5- 4	89 59 57	30 10 26	12-10-78	1624	13.0	2.0	5380.	8.2	8.8	22.9	6.5	5380.	8.2	8.9	22.8	11.0	5380.	8.2	8.8	22.8
5- 5	89 58 1	30 10 14	12-10-78	1642	16.5	2.0	5600.	8.0	8.9	22.8	8.2	5600.	8.0	8.9	22.8	14.5	5580.	8.0	8.8	22.7
5- 6	89 56 3	30 10 3	13-10-78	1733	16.0	2.0	5000.	8.3	9.3	24.0	8.0	6500.	8.1	9.2	23.5	14.0	7160.	7.8	8.1	23.5
5- 7	89 54 6	30 9 52	13-10-78	1715	14.0	2.0	6900.	8.3	9.7	24.0	7.0	7200.	8.2	8.8	23.5	12.0	7200.	7.8	8.4	23.0
6- 2	89 56 21	30 14 23	13-10-78	1555	14.5	2.0	5760.	8.1	8.9	24.5	7.3	6000.	8.0	8.8	24.5	12.5	5900.	7.8	8.2	23.0
6- 3	89 55 18	30 13 12	13-10-78	1615	14.0	2.0	6040.	8.1	9.1	24.0	7.0	6000.	8.0	9.0	23.0	12.0	5980.	7.7	8.0	22.5
6- 4	89 54 15	30 12 2	13-10-78	1633	13.0	2.0	6200.	8.2	9.4	24.0	6.5	6260.	8.2	9.3	23.5	11.0	7100.	7.7	7.9	23.5
7- 1	89 48 28	30 12 41	16-10-78	1427	10.0	2.0	5000.	7.9	8.5	20.2	4.0	5200.	7.8	8.5	20.0	8.0	5360.	7.9	8.4	20.0
7- 2	89 48 49	30 11 14	16-10-78	1440	8.5	2.0	5160.	8.0	8.6	20.5	4.3	5200.	8.0	8.6	20.5	6.5	5200.	8.0	8.6	20.5
7- 3	89 48 58	30 9 31	16-10-78	1150	7.5	2.0	4840.	7.9	8.4	20.0	3.8	4840.	7.9	8.4	20.0	5.5	4820.	7.9	8.4	20.0
7- 4	89 49 6	30 7 47	16-10-78	1205	8.5	2.0	5620.	7.8	8.3	20.0	4.3	5620.	7.8	8.3	20.3	6.5	5640.	7.8	8.2	20.2
7- 5	89 49 15	30 6 10	16-10-78	1220	7.0	2.0	6160.	7.9	8.6	20.3	3.5	6160.	7.9	8.6	20.3	5.0	6140.	7.9	8.6	20.3
8- 2	89 50 21	30 9 57	16-10-78	1425	11.5	2.0	5660.	8.0	8.6	20.5	5.8	5660.	8.0	8.6	20.5	9.5	5640.	8.0	8.6	20.3
8- 3	89 48 32	30 10 14	16-10-78	1410	7.0	2.0	5080.	8.0	8.8	20.5	3.5	5120.	7.9	8.9	20.5	5.0	5220.	8.0	9.3	20.5
8- 4	89 46 43	30 10 31	16-10-78	1349	6.0	2.0	5000.	7.9	8.7	20.5	3.0	5000.	7.9	8.8	20.5	4.0	5040.	7.9	8.8	20.5
9- 0	89 50 26	29 56 46	16-10-78	1845	9.0	2.0	1300.	7.8	9.2	21.6	4.5	1390.	7.7	8.8	21.9	7.0	1410.	7.7	8.8	21.9
9- 1	89 48 45	29 57 28	16-10-78	1157	7.0	2.0	12100.	7.8	8.8	20.4	3.5	12100.	7.8	8.7	20.4	5.0	13900.	7.8	7.7	20.7
9- 2	89 47 3	29 58 11	16-10-78	1211	7.5	2.0	11900.	7.9	9.1	20.4	3.5	11900.	7.9	9.1	20.4	5.5	11900.	7.9	9.0	20.4
9- 3	89 45 22	29 58 53	16-10-78	1221	8.0	2.0	11200.	7.9	9.2	20.3	4.0	11200.	7.9	9.1	20.2	6.0	11200.	7.9	9.0	20.2
9- 4	89 43 40	29 59 35	16-10-78	1238	8.0	2.0	10200.	7.9	9.2	20.0	4.0	10200.	7.9	9.2	20.0	6.0	10200.	7.9	9.1	20.0

(CONTINUED)

TABLE A1 (CONTINUED)

RANGE/ STAT	LAT			LONG		DATE	TIME	TOTAL DEPTH (FT)	SUR DEPTH (FT)	COND	PH	DO	TEMP	MID DEPTH (FT)	COND	PH	DO	TEMP	BOT DEPTH (FT)	COND	PH	DO	TEMP
9- 5	89	41	58	30	0	10	16-10-78	1253	8.5	2.0	10100.	7.9	9.3	20.1	4.3	10100.	7.9	9.2	20.0	6.5	10100.	7.9	9.2	20.0
9- 6	89	40	17	30	1	0	16-10-78	1305	8.0	2.0	11900.	7.9	9.1	20.5	4.0	11900.	7.9	9.1	20.5	6.0	11900.	7.9	9.1	20.5
9- 7	89	38	35	30	1	42	16-10-78	1317	8.0	2.0	13000.	8.0	9.2	20.7	4.0	13000.	8.0	9.2	20.4	6.0	13000.	8.0	9.0	20.4
9- 8	89	36	54	30	2	25	16-10-78	1340	8.0	2.0	13000.	8.0	9.2	21.0	4.0	13000.	8.0	9.1	20.6	6.0	13100.	8.0	8.9	20.6
9- 9	89	35	12	30	3	7	16-10-78	1353	7.5	2.0	13100.	8.0	9.1	20.7	3.8	13000.	8.0	9.0	20.6	5.5	13000.	8.0	9.0	20.7
9-10	89	33	31	30	3	49	16-10-78	1403	7.0	2.0	13200.	8.0	9.0	21.6	3.5	13100.	8.0	9.1	21.0	5.0	13100.	8.0	9.1	20.9
9-11	89	31	49	30	4	32	16-10-78	1418	7.0	2.0	14000.	7.9	9.2	20.7	3.5	14000.	7.9	9.1	20.7	5.0	13900.	7.9	9.1	20.6
9-12	89	30	7	30	5	14	16-10-78	1428	7.0	2.0	14900.	7.9	9.1	20.9	3.5	15100.	7.9	9.0	20.7	5.0	15100.	7.9	9.0	20.6
10- 1	89	30	37	30	6	35	16-10-78	1515	8.0	2.0	12500.	7.9	9.1	20.9	4.0	12500.	7.9	9.1	20.9	6.0	12200.	7.9	9.0	20.9
10- 3	89	31	35	30	9	35	16-10-78	1532	8.0	2.0	9000.	7.7	8.5	22.0	4.0	9100.	7.6	8.3	22.0	6.0	9050.	7.6	8.4	22.0
10- 4	89	32	5	30	11	16	16-10-78	1542	7.0	2.0	8220.	7.5	8.4	21.6	3.5	8220.	7.5	8.4	21.6	5.0	8200.	7.5	8.3	21.6
11- 8	89	37	57	30	9	29	16-10-78	1614	15.0	2.0	6980.	7.6	8.4	20.6	7.5	6970.	7.6	8.3	20.5	13.0	6980.	7.6	8.3	20.5
11-10	89	40	33	29	52	33	16-10-78	1753	7.0	2.0	14000.	7.9	9.5	21.3	3.5	13900.	7.9	9.5	21.3	5.0	13900.	8.0	9.5	21.3
12- 0	90	6	2	30	21	45	13-10-78	1000	4.5	2.0	3560.	7.5	8.1	23.8	2.3	3550.	7.5	8.1	23.6	3.5	3550.	7.5	8.1	23.5
12- 1	90	5	19	30	20	2	13-10-78	1011	12.0	2.0	3790.	7.4	8.1	23.5	6.0	3760.	7.4	8.1	23.1	10.0	3790.	7.4	8.0	23.1
12- 2	90	6	34	30	18	19	13-10-78	1030	11.0	2.0	4020.	7.6	8.3	23.1	7.5	4090.	7.5	8.1	23.0	9.0	4102.	7.5	8.2	23.0
12- 3	90	6	52	30	16	36	13-10-78	1042	15.0	2.0	4750.	7.8	8.5	23.4	7.5	4790.	7.8	8.4	23.0	13.0	4850.	7.7	8.1	23.0
12- 4	90	7	0	30	14	53	13-10-78	1058	16.0	2.0	5450.	7.8	8.6	23.1	8.0	5610.	7.8	8.5	23.0	14.0	5810.	7.4	7.2	23.0
12- 5	90	7	24	30	13	10	13-10-78	1129	16.0	2.0	5980.	8.1	9.0	23.5	8.0	6190.	7.9	8.6	23.2	14.0	6360.	7.5	7.5	23.2
12- 6	90	7	41	30	11	28	13-10-78	1139	16.0	2.0	6860.	8.1	9.1	23.5	8.0	6900.	7.7	8.0	23.2	14.0	6920.	7.6	7.8	23.1
12- 7	90	7	57	30	9	45	13-10-78	1624	16.0	2.0	6910.	8.5	10.8	25.0	8.0	7000.	7.7	8.0	23.4	14.0	7000.	7.6	7.7	23.0
12- 8	90	8	14	30	8	2	13-10-78	1622	16.0	2.0	7500.	6.8	13.2	25.0	8.0	7390.	7.8	8.4	23.3	14.0	7400.	7.7	7.8	23.3
12- 9	90	8	30	30	6	19	13-10-78	1655	16.0	2.0	7000.	8.1	9.2	24.3	8.0	7900.	8.0	8.4	23.6	14.0	7830.	7.7	7.7	23.5
12-10	90	8	47	30	4	36	13-10-78	1700	15.5	2.0	6980.	8.1	9.3	23.6	7.5	7020.	7.9	8.6	23.4	13.5	7900.	7.6	7.4	23.5
12-11	90	9	3	30	2	53	13-10-78	1721	14.0	2.0	7000.	8.2	9.7	24.0	7.0	6900.	8.2	9.8	24.2	12.0	6830.	7.3	6.7	23.2

(CONTINUED)

TABLE A1 (CONTINUED)

RANGE/ STAT	LAT	LONG	DATE	TIME	TOTAL DEPTH (FT)	SUR DEPTH (FT)	COND	PH	DO	TEMP	MID DEPTH (FT)	COND	PH	DO	TEMP	BOT DEPTH (FT)	COND	PH	DO	TEMP
12-12	90 9 20	30 1 11	13-10-78	1734	5.0	2.0	7200.	8.3	9.9	25.1	.0	0.	.0	.0	.0	3.0	6700.	8.2	9.7	25.1
13- 1	90 10 49	30 3 49	15-10-78	1152	15.0	2.0	5350.	7.7	7.8	20.9	7.5	5610.	7.6	7.5	21.0	13.0	6490.	7.7	7.5	21.0
13- 2	90 12 41	30 3 54	15-10-78	1203	15.0	2.0	5260.	7.7	7.9	21.1	7.5	5420.	7.6	7.6	20.9	13.0	6010.	7.6	7.5	20.9
13- 3	90 14 33	30 3 59	15-10-78	1217	14.0	2.0	5100.	7.6	7.7	20.0	7.0	5100.	7.6	7.6	20.0	12.0	5190.	7.6	7.6	20.7
13- 4	90 16 26	30 4 4	15-10-78	1228	14.0	2.0	5200.	7.7	7.9	21.0	7.0	5200.	7.7	7.7	20.9	12.0	5280.	7.6	7.6	20.0
13- 5	90 18 18	30 4 9	15-10-78	1238	13.5	2.0	5090.	7.8	8.3	21.7	6.7	5080.	7.7	7.8	20.8	11.5	5080.	7.6	7.6	20.7
13- 6	90 20 11	30 4 15	15-10-78	1250	13.0	2.0	4310.	7.7	7.9	21.1	6.5	4290.	7.6	7.7	20.7	11.0	4310.	7.6	7.7	20.0
13- 7	90 22 3	30 4 20	15-10-78	1301	12.0	2.0	4410.	7.8	8.1	21.4	6.0	4400.	7.8	7.8	21.0	10.0	4570.	7.6	7.4	21.0
13- 8	90 23 55	30 4 25	15-10-78	1316	9.0	2.0	4080.	7.8	8.2	20.9	4.5	4080.	7.9	7.7	20.5	7.0	4070.	7.7	7.6	20.4
14- 0	90 23 55	30 4 25	12-10-78	1420	12.0	2.0	4500.	7.8	9.0	24.0	6.0	4500.	7.7	8.9	24.0	10.0	4500.	7.5	8.3	23.5
14- 1	90 22 9	30 5 10	12-10-78	1407	14.0	2.0	3700.	8.3	10.0	23.0	7.0	3900.	8.1	9.6	23.0	12.0	3900.	7.7	9.8	23.0
14- 2	90 20 21	30 5 55	12-10-78	1352	14.0	2.0	3700.	8.1	9.4	23.0	7.0	3600.	7.9	9.4	22.5	12.0	3700.	7.6	8.6	23.0
14- 3	90 18 33	30 6 40	12-10-78	1338	14.0	2.0	3700.	8.0	9.5	23.5	7.0	3900.	7.9	9.5	23.0	12.0	3600.	7.6	9.5	22.5
14- 4	90 16 45	30 7 25	12-10-78	1325	15.0	2.0	4100.	8.0	9.5	23.5	7.5	4100.	7.9	9.3	23.0	13.0	4100.	7.6	9.5	23.0
14- 5	90 14 57	30 8 10	12-10-78	1305	16.0	2.0	4700.	8.2	9.6	23.0	8.0	6700.	8.1	9.6	23.0	14.0	5400.	7.8	9.5	23.0
14- 6	90 13 9	30 8 55	12-10-78	1252	15.0	2.0	5900.	8.2	9.4	23.0	7.5	6200.	8.0	8.9	23.0	13.0	6800.	7.8	8.2	23.0
14- 7	90 11 21	30 9 40	12-10-78	1233	16.0	2.0	6200.	8.1	9.6	23.5	8.0	6300.	8.1	9.4	23.0	14.0	6900.	7.8	8.8	23.0
14- 8	90 9 33	30 10 26	12-10-78	1201	15.0	2.0	6800.	8.0	9.3	23.0	7.5	6800.	7.9	8.9	23.0	13.0	6800.	7.8	9.1	23.0
15- 1	90 9 29	30 12 5	13-10-78	1214	15.0	2.0	6700.	8.2	9.0	24.5	7.5	6790.	7.8	8.5	23.2	13.0	6790.	7.7	8.0	23.2
15- 2	90 11 0	30 13 0	13-10-78	1255	17.0	2.0	6530.	8.0	9.1	24.9	8.5	6230.	7.8	8.6	23.1	15.0	6420.	7.7	7.8	23.3
15- 3	90 12 34	30 13 54	13-10-78	1311	16.0	2.0	6080.	7.9	8.7	24.1	8.0	6070.	7.9	8.5	23.3	14.0	6070.	7.7	8.0	23.3
15- 4	90 13 55	30 14 49	13-10-78	1327	15.0	2.0	5690.	7.8	8.6	24.3	7.5	5500.	7.8	8.3	23.7	13.0	5830.	7.6	7.7	23.5
15- 5	90 15 27	30 15 43	13-10-78	1401	13.0	2.0	4490.	7.8	8.5	25.0	6.5	4090.	7.7	8.3	23.2	11.0	4600.	7.4	7.6	23.3
15- 6	90 17 8	30 16 38	13-10-78	1413	8.0	2.0	2610.	7.6	8.3	24.9	4.0	2570.	7.6	8.4	24.4	6.0	2570.	7.5	8.2	24.2
15- 7	90 18 32	30 17 32	13-10-78	1428	9.0	2.0	2460.	7.5	8.2	24.7	4.5	2480.	7.3	7.8	23.9	7.0	2490.	7.3	7.7	23.9

(CONTINUED)

TABLE A1 (CONCLUDED)

RANGE/ STAT	LAT	LONG	DATE	TIME	TOTAL DEPTH (FT)	SUR DEPTH (FT)	COND	PH	DO	TEMP	MID DEPTH (FT)	COND	PH	DO	TEMP	BOT DEPTH (FT)	COND	PH	DO	TEMP
16- 2	90 16 40	30 18 7	13-10-78	1500	9.0	2.0	2230.	7.5	8.5	24.6	4.5	2250.	7.6	8.4	24.5	7.0	2210.	7.6	8.4	24.3
16- 3	90 15 4	30 18 43	13-10-78	1524	11.0	2.0	3090.	7.7	8.5	24.9	5.5	2700.	7.5	8.2	23.3	9.0	3110.	7.4	8.0	23.3
16- 4	90 13 19	30 19 19	15-10-78	1503	9.0	2.0	3680.	7.7	8.1	21.6	4.5	3600.	7.7	8.1	21.6	7.0	3600.	7.7	8.0	21.4
16- 5	90 11 35	30 19 54	15-10-78	1521	9.0	2.0	3120.	7.7	8.2	21.7	4.5	3140.	7.8	8.2	21.1	7.0	3270.	7.7	8.0	21.1
16- 6	90 9 51	30 20 30	15-10-78	1539	9.0	2.0	3890.	7.8	8.3	21.7	4.5	3800.	7.8	8.2	21.6	7.0	3800.	7.8	8.2	21.6
16- 7	90 8 7	30 21 5	15-10-78	1551	11.5	2.0	3220.	7.6	8.0	21.6	5.7	3250.	7.6	7.9	21.5	9.5	3300.	7.5	7.7	21.6
17- 1	90 23 16	30 6 3	12-10-78	1444	13.0	2.0	3900.	8.3	10.2	23.5	6.5	3900.	8.1	10.4	23.0	11.0	3900.	7.6	9.8	23.0
17- 2	90 22 36	30 7 41	12-10-78	1515	13.0	2.0	3700.	8.1	9.8	23.0	6.5	3700.	8.2	10.0	23.0	11.0	3700.	8.0	10.4	22.5
17- 3	90 21 55	30 9 20	12-10-78	1525	14.0	2.0	2700.	7.7	9.9	23.0	7.0	3500.	7.7	9.8	23.0	12.0	2750.	7.6	9.7	23.0
17- 4	90 21 15	30 10 58	12-10-78	1537	12.0	2.0	3300.	8.1	9.5	23.5	6.0	3400.	8.1	9.5	23.5	10.0	3500.	8.0	9.6	23.5
17- 5	90 20 34	30 12 37	12-10-78	1550	12.0	2.0	3200.	7.9	9.0	23.5	6.0	3100.	7.9	9.1	23.5	10.0	3100.	7.8	9.2	23.0
17- 6	90 19 53	30 14 15	12-10-78	1604	11.0	2.0	3000.	7.7	8.9	23.5	5.5	3000.	7.7	9.0	23.0	9.0	3000.	7.7	9.7	23.5
17- 7	90 19 13	30 15 54	12-10-78	1623	10.0	2.0	2600.	7.6	8.8	24.0	5.0	2700.	7.6	8.9	23.5	8.0	2650.	7.6	9.6	23.5
17- 8	90 18 32	30 17 32	12-10-78	1631	10.0	2.0	2600.	7.5	8.4	23.5	5.0	2600.	7.5	8.5	23.5	8.0	2550.	7.5	8.0	23.5

TABLE A2

LAKE PONTCHARTRAIN TRANSECT SURVEY, AUGUST 1979

RANGE/ STAT	LAT	LONG	DATE	TIME	TOTAL DEPTH (FT)	SUR DEPTH (FT)	COND	PH	DO	TEMP	MID DEPTH (FT)	COND	PH	DO	TEMP	BOT DEPTH (FT)	COND	PH	DO	TEMP
2- 0	90 2 13	30 1 58	27- 8-79	945	6.9	2.0	6100.	8.2	6.7	28.5	3.5	6150.	8.1	6.4	28.0	5.0	6200.	8.0	5.6	28.5
2- 1	90 3 14	30 3 33	27- 8-79	1010	10.2	2.0	6400.	8.2	7.1	28.5	5.0	6400.	8.2	7.0	28.5	9.0	6500.	8.2	6.6	28.5
2- 2	90 3 31	30 5 5	27- 8-79	1028	16.0	2.0	5800.	8.2	7.6	28.5	8.0	5800.	8.2	7.4	28.5	14.0	5000.	8.2	7.0	28.5
2- 3	90 5 2	30 6 36	27- 8-79	1045	17.0	2.0	5100.	8.2	6.8	29.0	8.5	5100.	8.2	6.0	28.5	15.0	5150.	8.2	6.5	28.5
2- 4	90 5 58	30 0 7	27- 8-79	1055	18.0	2.0	4800.	8.2	6.8	28.5	9.0	4800.	8.2	6.5	28.5	16.0	4050.	8.2	6.1	28.5
2- 5	90 6 51	30 9 39	27- 8-79	1125	17.0	2.0	4400.	8.4	6.9	29.0	8.5	4400.	8.2	6.8	28.5	15.0	4100.	8.2	6.4	28.5
2- 6	90 7 45	30 11 11	27- 8-79	1150	16.0	2.0	3500.	8.2	7.0	29.0	8.0	3500.	8.2	7.0	29.0	14.0	3500.	8.2	6.7	28.5
5- 1	90 5 40	30 10 59	27- 8-79	1250	18.0	2.0	3600.	8.3	7.0	29.0	9.0	3650.	8.2	7.0	28.5	16.0	3700.	8.2	6.7	28.5
5- 2	90 3 51	30 10 48	27- 8-79	1300	17.0	2.0	3500.	8.2	7.0	29.0	8.5	3500.	8.2	6.9	29.0	15.0	3500.	8.2	6.8	23.0
5- 3	90 1 54	30 10 37	28- 8-79	1105	17.0	2.0	3700.	7.9	7.2	28.5	8.5	3700.	7.8	6.9	28.5	15.0	3700.	7.8	6.8	28.5
5- 4	89 59 57	30 10 26	28- 8-79	1120	16.0	2.0	4100.	7.8	7.1	29.0	8.0	4100.	7.8	7.0	29.0	14.0	4050.	7.7	6.7	28.5
5- 5	89 58 1	30 10 14	28- 8-79	1141	18.0	2.0	4700.	7.9	7.5	28.5	9.0	4700.	7.7	7.3	28.5	16.0	5000.	7.5	7.2	28.5
5- 6	89 56 3	30 10 3	28- 8-79	1155	15.0	2.0	5500.	7.9	7.8	28.5	7.5	5500.	7.9	7.8	28.5	13.0	5600.	7.7	7.4	28.5
5- 7	89 54 6	30 9 52	28- 8-79	1207	12.0	2.0	5700.	7.7	7.1	28.5	6.0	5650.	7.6	7.1	28.5	10.0	5650.	7.6	7.1	28.5
5- 8	89 51 56	30 9 27	28- 8-79	1230	12.0	2.0	7300.	7.6	7.0	28.5	6.0	7300.	7.6	7.0	28.5	10.0	7300.	7.6	6.9	28.5
7- 0	89 48 26	30 5 49	28- 8-79	1340	9.0	2.0	8000.	7.4	6.8	29.0	4.5	8000.	7.4	6.6	29.0	7.0	8000.	7.4	6.6	29.0
7- 1	89 48 28	30 12 41	28- 8-79	1350	11.0	2.0	10000.	7.5	7.1	29.0	5.5	10000.	7.4	6.0	29.0	9.0	10000.	7.4	6.8	29.0
7- 2	89 48 49	30 11 14	28- 8-79	1400	9.0	2.0	10000.	7.4	7.0	29.0	4.5	10000.	7.4	7.0	29.0	7.0	10000.	7.4	6.9	29.0
7- 3	89 48 58	30 9 31	28- 8-79	1407	10.0	2.0	8500.	7.6	7.0	28.5	5.0	8500.	7.5	6.9	28.5	8.0	8500.	7.5	6.8	28.5
7- 4	89 49 6	30 7 47	28- 8-79	1421	7.0	2.0	9500.	7.5	6.3	28.5	3.5	9600.	7.5	6.3	28.5	5.0	9600.	7.5	6.2	28.5
8- 1	89 50 11	30 9 40	28- 8-79	1245	12.0	2.0	8500.	7.4	6.4	28.5	6.0	8500.	7.4	6.4	28.5	10.0	8500.	7.4	6.5	28.5
8- 2	89 50 21	30 9 57	28- 8-79	1254	9.0	2.0	10500.	7.4	6.8	29.0	4.5	10500.	7.4	6.8	29.0	7.0	11000.	7.4	6.8	29.0
8- 3	89 48 32	30 10 14	28- 8-79	1310	7.0	2.0	11000.	7.2	5.6	29.0	3.5	11000.	7.2	5.6	29.0	5.0	11000.	7.2	5.6	29.0
8- 4	89 46 43	30 10 31	28- 8-79	1325	51.0	2.0	10500.	7.2	6.0	29.0	25.5	11000.	7.1	5.2	29.5	49.0	12000.	7.1	5.0	29.5
12- 0	90 6 2	30 21 45	29- 8-79	1315	10.0	2.0	1700.	7.6	6.0	30.0	5.0	1700.	7.6	6.6	29.5	8.0	1700.	7.6	6.6	29.5

(CONTINUED)

TABLE A2 (CONTINUED)

RANGE/ STAT	LAT	LONG	DATE	TIME	TOTAL DEPTH (FT)	SUR DEPTH (FT)	COND	PH	DO	TEMP	MID DEPTH (FT)	COND	PH	DO	TEMP	BOT DEPTH (FT)	COND	PH	DO	TEMP
12- 1	90 6 19	30 20 2	29- 8-79	1325	14.0	2.0	1800.	7.8	7.3	29.5	7.0	1800.	7.7	7.2	29.0	12.0	1800.	7.6	6.5	29.0
12- 2	90 6 34	30 18 19	29- 8-79	1336	15.0	2.0	2150.	8.4	8.4	29.5	7.5	2150.	8.3	8.2	29.0	13.0	2150.	7.8	7.0	29.0
12- 3	90 6 52	30 16 36	29- 8-79	1350	16.0	2.0	2500.	8.2	8.0	29.5	8.0	2500.	8.0	7.7	29.5	14.0	2500.	7.7	6.9	29.0
12- 4	90 7 8	30 14 53	29- 8-79	1400	16.0	2.0	2700.	8.0	7.9	29.5	8.0	2700.	7.9	7.6	29.5	14.0	2700.	7.6	7.1	29.0
12- 5	90 7 24	30 13 10	29- 8-79	1410	16.0	2.0	2900.	8.0	7.9	29.5	8.0	2900.	7.9	7.7	29.5	14.0	2900.	7.6	6.8	29.0
12- 6	90 7 41	30 11 28	29- 8-79	1013	16.0	2.0	3550.	7.8	7.2	28.5	8.0	3600.	7.8	7.2	28.5	14.0	3700.	7.7	7.0	28.5
12- 7	90 7 57	30 9 45	29- 8-79	1003	16.0	2.0	4000.	7.8	7.0	28.5	8.0	4000.	7.8	6.9	28.5	14.0	4000.	7.7	6.8	28.5
12- 8	90 8 14	30 8 2	29- 8-79	952	16.0	2.0	4550.	7.8	7.1	28.5	8.0	4600.	7.8	7.0	28.5	14.0	4600.	7.7	6.9	28.5
12- 9	90 8 30	30 6 19	29- 8-79	940	16.0	2.0	5400.	7.7	6.8	28.5	8.0	5400.	7.7	6.8	28.5	14.0	5400.	7.6	6.5	28.5
12-10	90 8 47	30 4 36	29- 8-79	926	16.0	2.0	5800.	7.8	7.0	28.5	8.0	5750.	7.7	6.9	28.5	14.0	5750.	7.6	6.8	28.5
12-11	90 9 3	30 2 53	29- 8-79	913	15.0	2.0	6100.	7.6	6.7	28.5	7.5	6100.	7.6	6.6	28.5	13.0	6100.	7.6	6.5	28.5
12-12	90 9 20	30 1 11	29- 8-79	900	7.0	2.0	5100.	7.3	4.8	28.5	3.5	5100.	7.2	4.7	28.5	5.0	5100.	7.2	4.6	28.5
14- 1	90 22 9	30 5 10	29- 8-79	1545	10.0	2.0	3050.	7.9	8.1	29.0	5.0	3050.	7.8	7.0	28.5	8.0	3100.	7.6	8.0	28.5
14- 2	90 20 21	30 5 55	29- 8-79	1536	14.0	2.0	2750.	8.2	8.2	29.0	7.0	2750.	8.2	8.1	28.5	12.0	2750.	7.7	6.9	28.5
14- 3	90 18 33	30 6 40	29- 8-79	1526	15.0	2.0	3400.	8.2	8.3	29.0	7.5	3400.	8.2	8.2	29.0	13.0	3350.	7.8	7.2	28.5
14- 4	90 16 45	30 7 25	29- 8-79	1516	15.0	2.0	3650.	8.1	8.3	29.0	7.5	3650.	8.0	7.0	29.0	13.0	3650.	7.7	6.8	28.5
14- 5	90 14 57	30 0 10	29- 8-79	1506	16.0	2.0	4300.	8.0	7.8	29.0	8.0	4300.	8.0	7.4	29.0	14.0	4100.	7.6	6.4	28.5
14- 6	90 13 9	30 0 55	29- 8-79	1457	17.0	2.0	4900.	8.0	7.9	29.0	8.5	4900.	7.9	7.0	29.0	15.0	4950.	7.7	6.8	28.5
14- 7	90 11 21	30 9 40	29- 8-79	1440	17.0	2.0	4150.	8.0	7.6	29.0	8.5	4150.	7.8	7.1	29.0	15.0	4200.	7.6	6.2	28.5
14- 8	90 9 33	30 10 26	29- 8-79	1426	17.0	2.0	4350.	8.0	7.8	29.0	8.5	4400.	8.0	7.5	29.0	15.0	4450.	7.7	6.8	29.0
15- 0	90 18 4	30 17 25	29- 8-79	1123	30.0	2.0	1500.	7.6	6.9	29.5	15.0	1600.	7.5	6.9	29.0	28.0	1800.	7.6	7.0	29.0
15- 1	90 9 29	30 12 5	29- 8-79	1114	7.0	2.0	2450.	8.1	7.4	29.5	3.5	2450.	8.1	7.3	29.5	5.0	2450.	8.0	7.3	29.5
15- 2	90 11 0	30 13 0	29- 8-79	1105	13.0	2.0	2500.	8.0	7.2	29.0	6.5	2500.	8.0	7.1	29.0	11.0	2500.	8.0	7.0	29.0
15- 3	90 12 34	30 13 54	29- 8-79	1057	14.0	2.0	2800.	8.1	7.4	29.0	8.0	2800.	8.1	7.3	29.0	14.0	2800.	8.0	7.2	29.0
15- 4	90 13 55	30 14 49	29- 8-79	1047	16.0	2.0	2900.	8.0	7.4	29.0	8.0	2900.	8.0	7.3	29.0	14.0	2950.	7.8	7.1	29.0

(CONTINUED)

TABLE A2 (CONCLUDED)

RANGE/ STAT	LAT	LONG	DATE	TIME	TOTAL DEPTH (FT)	SUR DEPTH (FT)	COND	PH	DO	TEMP	MID DEPTH (FT)	COND	PH	DO	TEMP	BOT DEPTH (FT)	COND	PH	DO	TEMP
15- 5	90 15 27	30 15 43	29- 8-79	1030	16.0	2.0	3200.	7.8	7.4	28.5	8.0	3200.	7.8	7.4	28.5	14.0	3200.	7.8	7.2	28.5
15- 6	90 17 0	30 16 30	29- 8-79	1029	16.0	2.0	3550.	7.8	7.4	28.5	8.0	3550.	7.8	7.4	28.5	14.0	3550.	7.8	7.3	28.5

(Sheet 3 of 3)

Table A3

Second Lake Pontchartrain Transect Survey Data Summary

Constituent	Surface		Middepth		Bottom		Composite			
	No. of Samples	Mean Value	No. of Samples	Mean Value	No. of Samples	Mean Value	No. of Samples	Mean Value	Range Min	Range Max
Conductivity	114	6250	113	6320	114	6450	341	6340	1390	15,100
pH	114	8.0	113	7.9	114	7.8	341	7.9	6.8	8.9
Dissolved Oxygen	114	8.9	113	8.7	114	8.4	341	8.7	4.3	13.2
Temperature	114	22.4	113	22.0	114	22.0	341	22.1	20.0	25.1

Table A4

Second Lake Pontchartrain Transect Survey Data Summary

Constituent	Surface		Middepth		Bottom		Composite			
	No. of Samples	Mean Value	No. of Samples	Mean Value	No. of Samples	Mean Value	No. of Samples	Mean Value	Range Min	Range Max
Conductivity	52	4980	52	5000	52	5050	156	5010	1500	12,000
pH	52	7.9	52	7.8	52	7.7	156	7.8	7.1	8.4
Dissolved Oxygen	52	7.2	52	7.0	52	6.7	156	7.0	4.6	8.4
Temperature	52	28.9	52	28.8	52	28.7	156	28.8	28.0	30.0

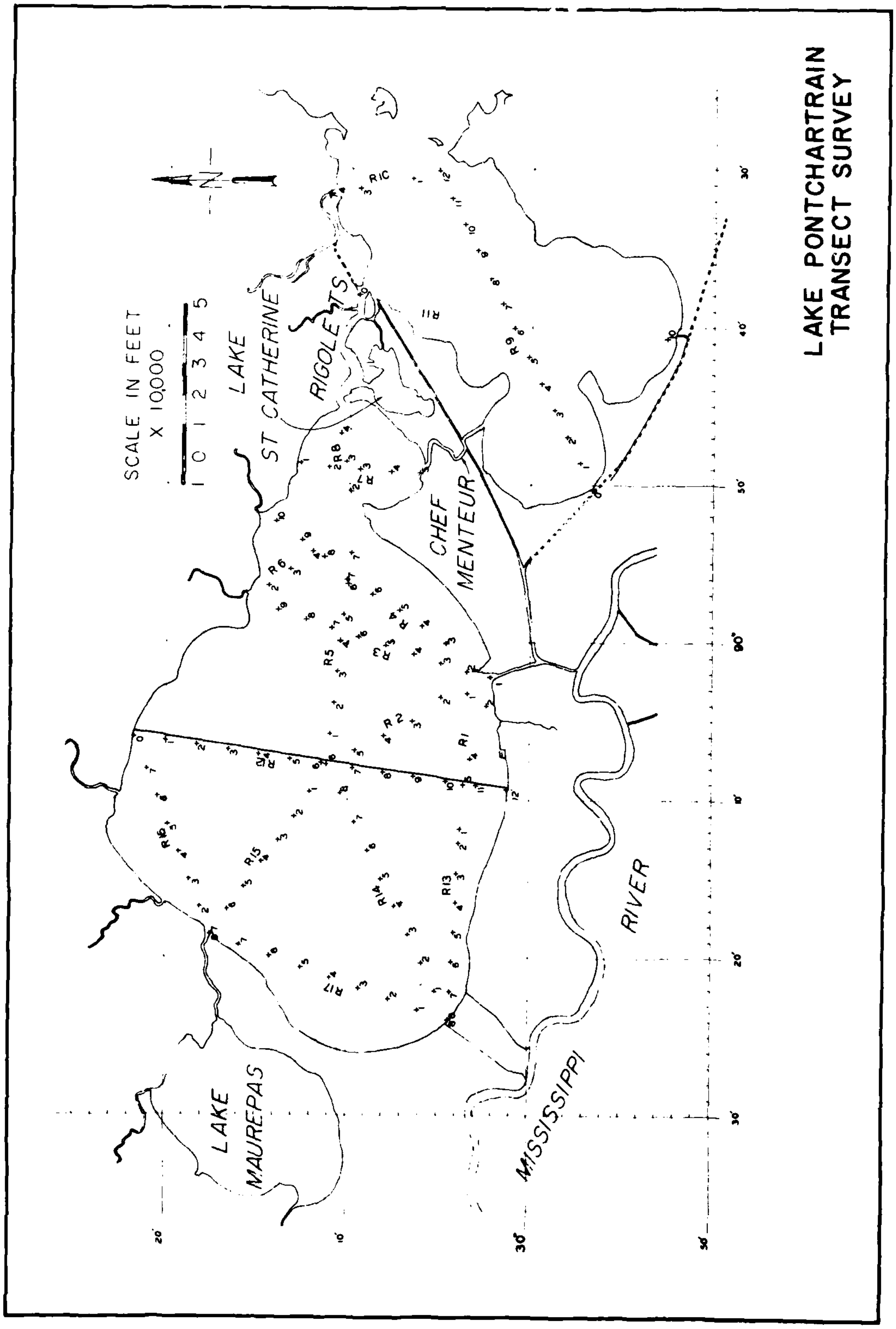

LAKE PONTCHARTRAIN
TRANSECT SURVEY
SCALE IN FEET
X 10,000
1 0 1 2 3 4 5
LAKE
ST CATHERINE
RIGOLETS
CHEF
MENTEUR
LAKE
MAUREPAS
MISSISSIPPI
RIVER

PLATE A1

APPENDIX B: SUPPLEMENTAL CURRENT SURVEY ANALYSIS RESULTS

Observed Currents

1. The period of record and status of the data for each station in the supplemental current survey are shown in Table B1. Station locations are shown in Plate B1. A sufficiently long record for constituent analysis was obtained at 9 of the 14 stations in the survey. As indicated in Table B1, the current meters at sta C7, C11, and C12 were lost during the survey. At C6, velocity magnitude data were not properly recorded on tape, and at C22, current direction data were not available most of the time due to tilting of the current meter. A similar condition, although not as severe, developed at sta C9. At sta C9, tidal current reversal was quite distinct, and periods of flood and ebb currents were determined by correlation with sta C8.

2. Observed prototype current data for eight of the nine stations (C5, C8, C10, C13 through C16, and C21) are shown in Plates B2-B41 and include a current direction summary diagram, current ebb and flood magnitude, current direction, component of the flood and ebb velocity along the average direction of flow, and current component perpendicular to the average flood and ebb direction. Observed data for sta C9 is omitted due to frequent loss of direction data. At sta C5, in the Intracoastal Waterway, observed data are quite similar to the data previously observed at sta V5. The direction is approximately 15 deg farther clockwise due to the location of sta C5 at the westward bend in the Intracoastal Waterway. Sta C8 was located near sta V8 but in a region of higher currents near the west shore of Chef Menteur immediately north of the railroad bridge. Maximum flood and ebb currents were near 3 fps. Flood currents tended to have a slightly more northerly direction than the direction opposite from the ebb currents, probably due to the eastward bend upstream. Sta C10 was located just within The Rigolets near navigation light "5." Flood and ebb currents were relatively uniform in direction. The variability shown in the plotted direction data is due to occasional compass sticking. Maximum flood

and ebb currents were higher at sta C10 (about 3.5 fps) than those observed previously at sta V10-S (about 2.9 fps ebb and 1.8 fps flood), which was located slightly west of light "5." Also, the flow direction axis was rotated about 45 deg clockwise from the previous observations.

3. Sta C13 and C14 were located in the west mouth of the West Pearl River and in East Pass between The Rigolets and Little Lake, respectively. The flood direction was taken as flow approximately north into the west mouth of West Pearl River (sta C13) and west through East Pass into The Rigolets (sta C14). As indicated by the velocity data, flow was primarily ebb at sta C13 (maximum about 1.8 fps) as previously shown for sta V13 located near sta C13. Flow in the west mouth (sta C13) was into The Rigolets or in the ebb direction when the flow in The Rigolets (sta C15) was into Lake Pontchartrain or in flood direction, and vice versa. Ebb flow in East Pass (sta C14) normally developed only during the first several hours of ebb currents in The Rigolets. At the east end of The Rigolets, sta C15, the magnitude of ebb currents (maximum 3.2 fps) was approximately 50 percent higher than that of flood currents (maximum 1.8 fps). The directions of flood and ebb currents were approximately along an east-west line with more variability shown in the flood current direction than in the ebb direction.

4. At sta C16 in the mouth of the Pearl River, flood and ebb currents were primarily aligned with the channel with higher observed currents in the ebb direction (maximum 2.8 fps). In Pass Manchac at sta C21, currents also were along channel with maximum flood and ebb currents over the observation interval of approximately 0.7 fps.

Constituent Analysis

5. Table B2 contains results of the harmonic analysis for the tidal constituents for the nine current stations where sufficient data were obtained. The local epoch is given in Table B3. The record length used for all stations was 27 days (12 August to 8 September 1979) except for sta C21 (26 days) which started one day later. Prototype current observations were available through 17 to 19 September for most

stations; however, data from Hurricane Frederic on 12 September 1979 had a significant effect on results of the harmonic analysis and the latter period of observation had to be excluded from the analysis. Constituent amplitudes for sta C5 and V5 should compare directly due to their location in the Intracoastal Waterway in similar channel bathymetry. Constituent amplitudes do compare within 0.01 to 0.02 fps except for the M2 and S2 constituents where the analysis for sta C5 indicated an increase in M2 amplitude (to 0.08 fps from 0.05 fps) and a decrease in S2 amplitude (to 0.04 fps from 0.08 fps). The total magnitude represented by the two constituents is quite similar, however. The difference in sta C5 and V5 results for M2 and S2 is probably due to short record length in concert with the small period difference between the two constituents and the relatively low amplitude of the two constituents. Meter locations were not as close at other stations and the amplitudes between surveys do not compare.

6. Amplitudes of O1 and K1 are the largest diurnal tidal constituents, especially in the channels connecting Lakes Borgne and Pontchartrain. The magnitude of the K1 constituent is, of course, influenced by the P1 constituent for such a short record length. M2 has the largest amplitude of the semidiurnal constituents. The calculated phase lag of the O1 constituent from sta C8 to the remaining stations in the supplemental and intensive data acquisition program was:

Station	Phase lag, hr	
	Supplemental	Intensive
C5	-5.4	-5.4
C9	1.1	--
C10	1.7	--
C13	9.2	9.7
C14	-2.1	--
C15	0.7	--
C16	3.1	--
C21	7.1	6.5

The phase lags at sta C5, C13, and C21 agree reasonably well with those for sta V5, V13, and V21-S, considering changes in station locations and the relatively short records used.

Table B1

Supplemental Data Acquisition Program:

Operational Status of Current Meters

Station	Data Record, 1979	Data Status
C5	8-8/9-18	Complete data record
C6	--	Velocity data not recorded
C7	--	Meter lost
C8	8-9/9-17	Complete data record
C9	8-9/9-4	Direction data sticking. Flood and ebb velocity correlated with C8. Meter lost after 9-6
C10	8-9/9-10	Occasional direction sticking
C11-M	--	Meter lost
C11-B	--	Meter lost
C12-M	--	Meter lost
C12-B	--	Meter lost
C13	8-10/9-19	Complete data record
C14	8-10/9-19	Complete data record
C15	8-10/9-19	Complete data record
C16	8-10/9-19	Complete data record
C21	8-10/9-26	Complete data record
C22	--	Direction sticking

Table B2

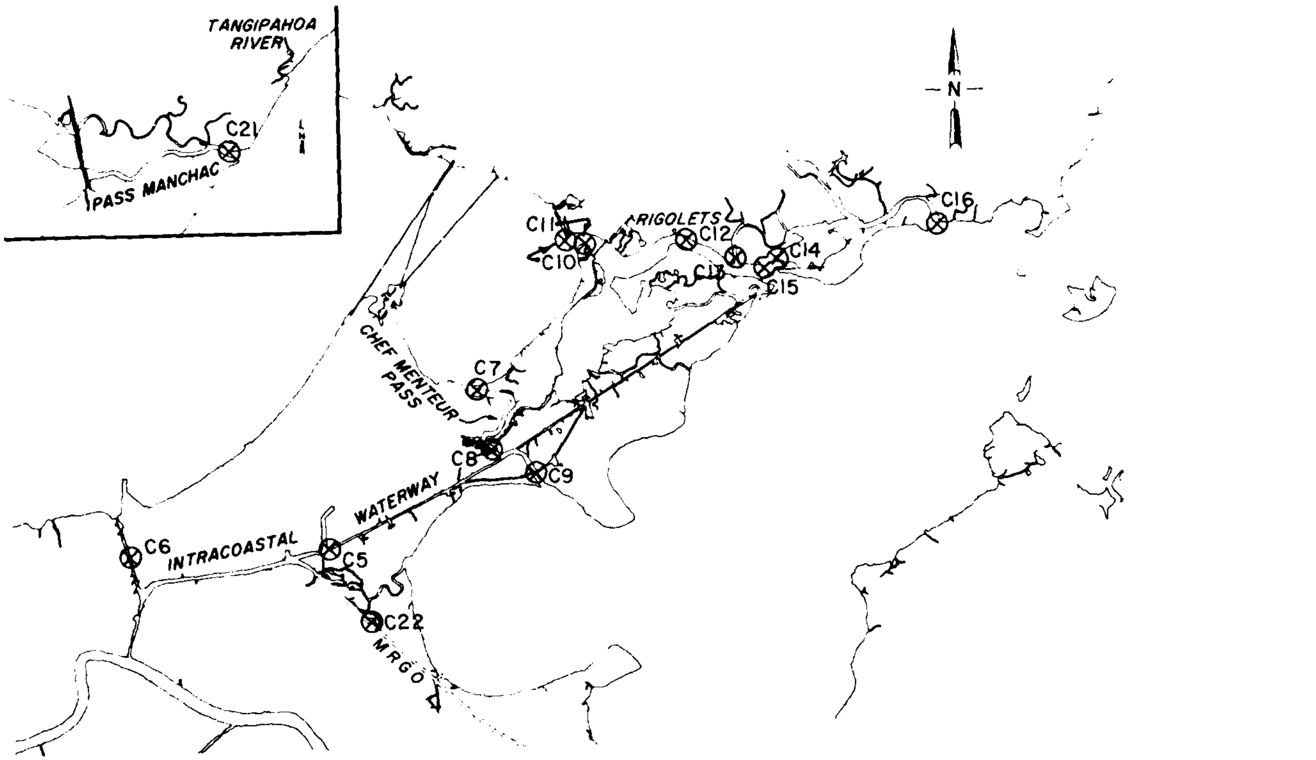
Supplemental Current Survey Constituent Amplitude

Current Gage	Current Constitute Amplitude, ft											Residual rms, ft	Mean Velocity fps
	O1	K1	Q1	M1	J1	M2	S2	N2	M4	M6	M8		
C5	0.15	0.11	0.02	0.04	0.05	0.08	0.04	0.01	0.03	0.01	0.01	0.14	-0.21
C8	1.16	1.46	0.23	0.21	0.11	0.39	0.17	0.17	0.03	0.03	--	0.49	0.17
C9	1.10	1.34	0.39	0.11	0.16	0.28	0.14	0.09	--	0.01	0.01	0.31	0.00
C10	1.07	1.34	0.20	0.23	0.10	0.28	0.10	0.02	0.03	0.02	0.02	0.42	-0.17
C13	0.34	0.53	0.03	0.19	0.08	0.17	0.04	0.06	0.01	0.01	--	0.23	-0.38
C14	0.19	0.28	0.03	0.14	0.06	0.22	0.04	0.04	0.06	0.01	0.01	0.27	-0.37
C15	0.68	0.87	0.16	0.22	0.13	0.24	0.13	0.03	0.02	0.02	--	0.31	-0.05
C16	0.64	0.76	0.16	0.04	0.06	0.31	0.16	0.07	0.09	0.02	0.01	0.23	-0.26
C21	0.21	0.23	0.04	0.07	0.02	0.03	0.02	0.02	--	--	--	0.07	-0.02

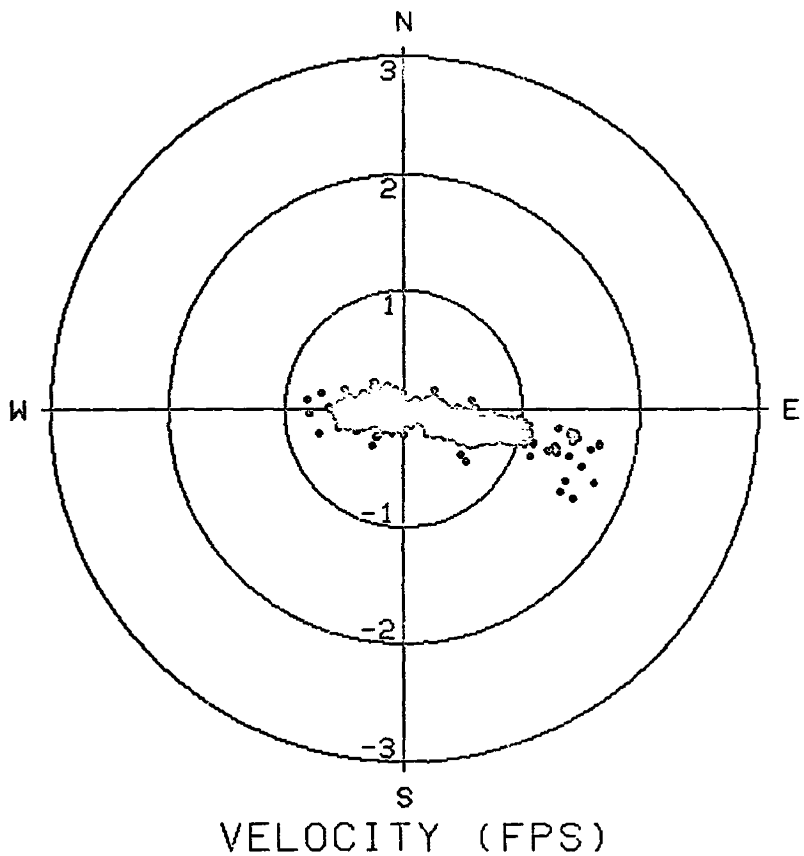
Table B3

Local Epoch for Tidal Currents, Supplemental Survey

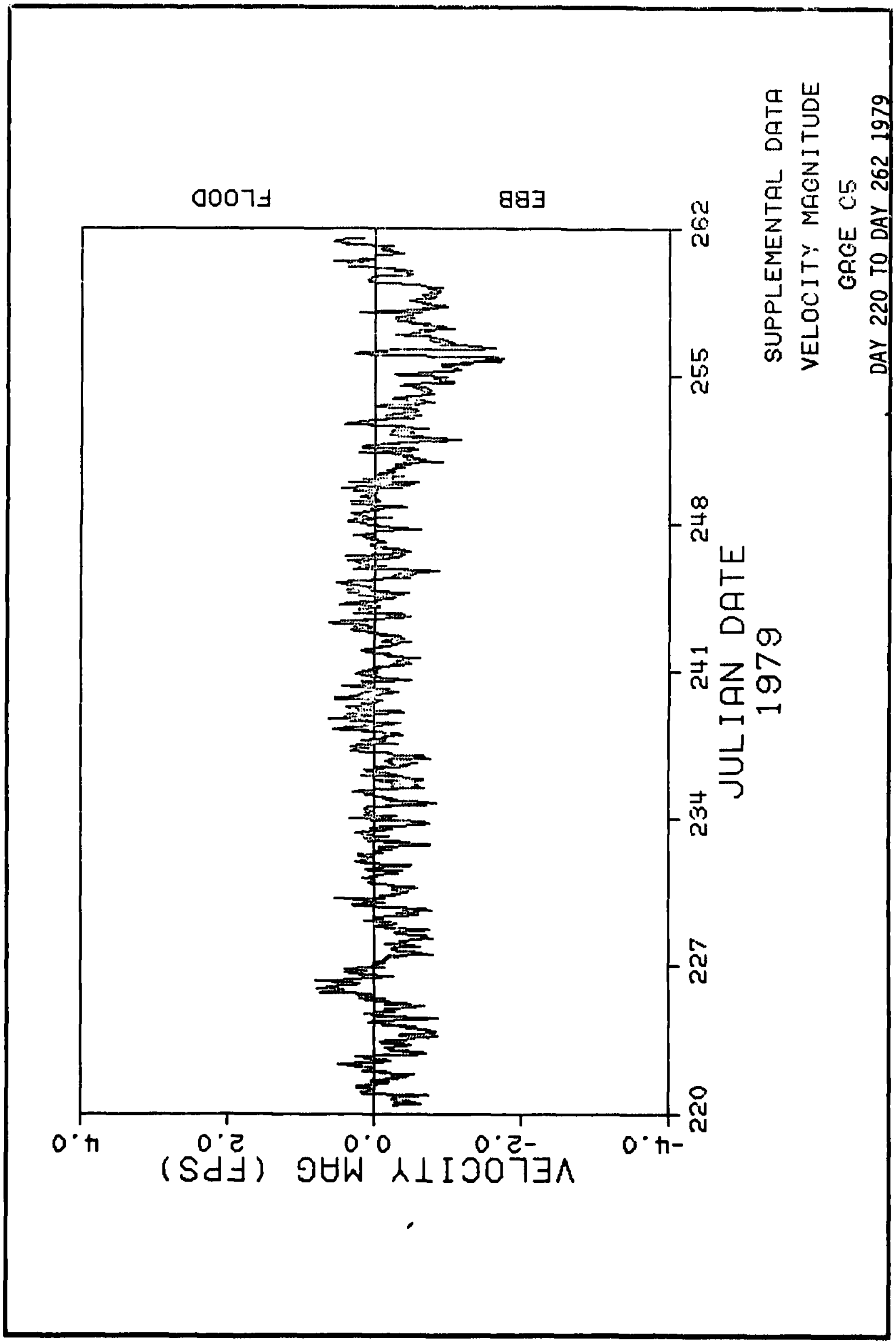
Current Gage	Local Epoch, deg										
	O1	K1	Q1	M1	J1	M2	S2	N2	M4	M6	M8
C5	255.7	303.7	305.3	155.1	180.6	78.1	323.8	202.1	45.1	356.6	62.9
C8	0.0	44.9	331.9	254.2	234.4	136.0	253.7	220.6	33.7	164.9	--
C9	0.4	48.0	350.0	148.0	48.8	161.5	226.5	226.3	--	194.5	189.5
C10	11.1	46.9	350.5	290.8	315.0	138.3	78.9	193.6	22.5	117.9	174.0
C13	229.1	279.2	50.4	79.9	311.8	1.3	169.8	335.5	321.0	56.1	--
C14	29.2	71.7	325.3	226.9	57.2	130.4	299.5	26.0	328.7	90.8	58.1
C15	349.9	39.9	316.5	250.9	107.1	144.7	78.0	141.7	308.2	194.9	--
C16	317.4	358.4	314.5	248.0	346.4	79.9	98.7	72.4	265.4	25.2	75.6
C21	97.8	139.0	111.7	344.6	67.7	285.9	65.4	17.5	--	--	--



STATION LOCATIONS



SUPPLEMENTAL DATA
VELOCITY DATA SUMMARY
GAGE C5



SUPPLEMENTAL DATA
VELOCITY MAGNITUDE
GAGE C5
DAY 220 TO DAY 262 1979
FLOOD
EBB
VELOCITY MAG (FPS)
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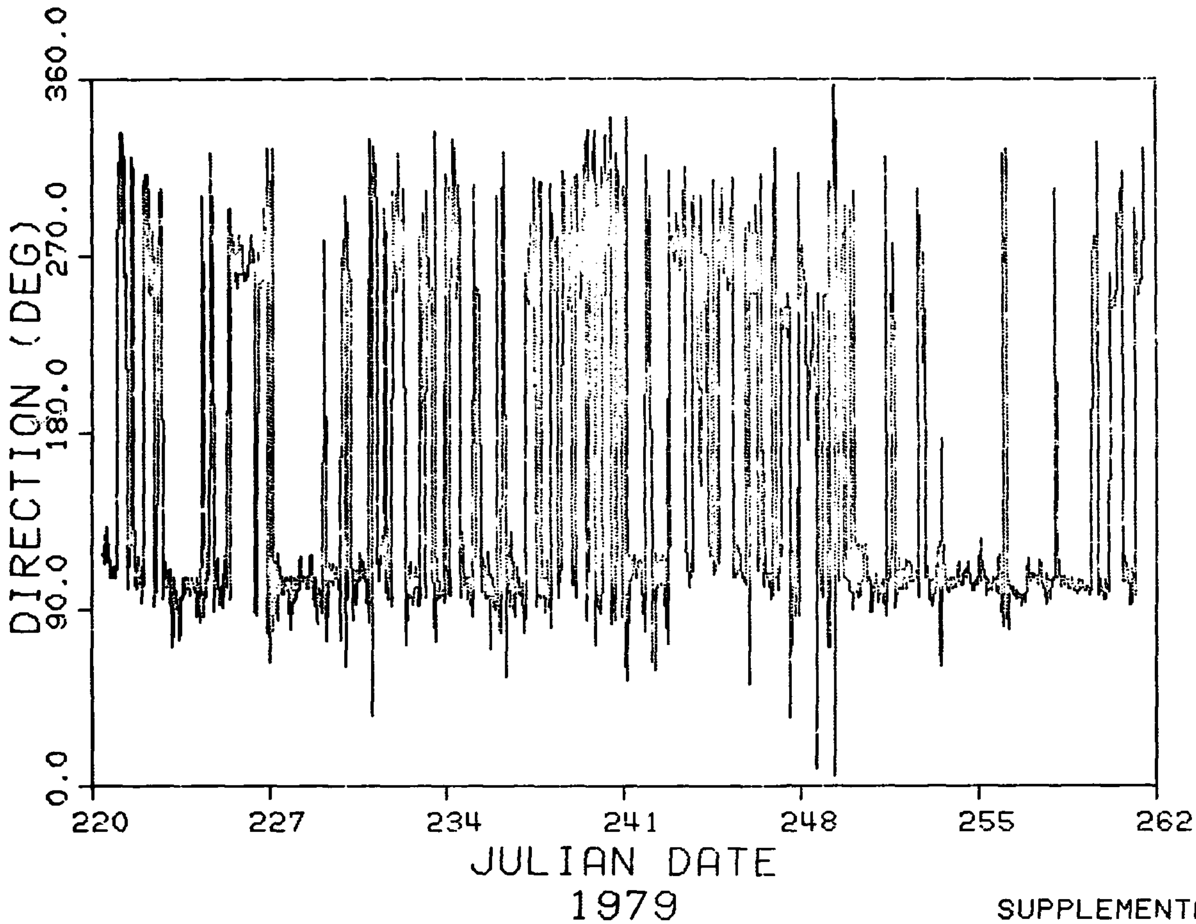
0.0
-2.0
-4.0
220
227
234
241
248
255
262
JULIAN DATE
1979



SUPPLEMENTAL DATA
VELOCITY DIRECTION
GAGE C5
DAY 220 TO DAY 262 1979

PLATE B4

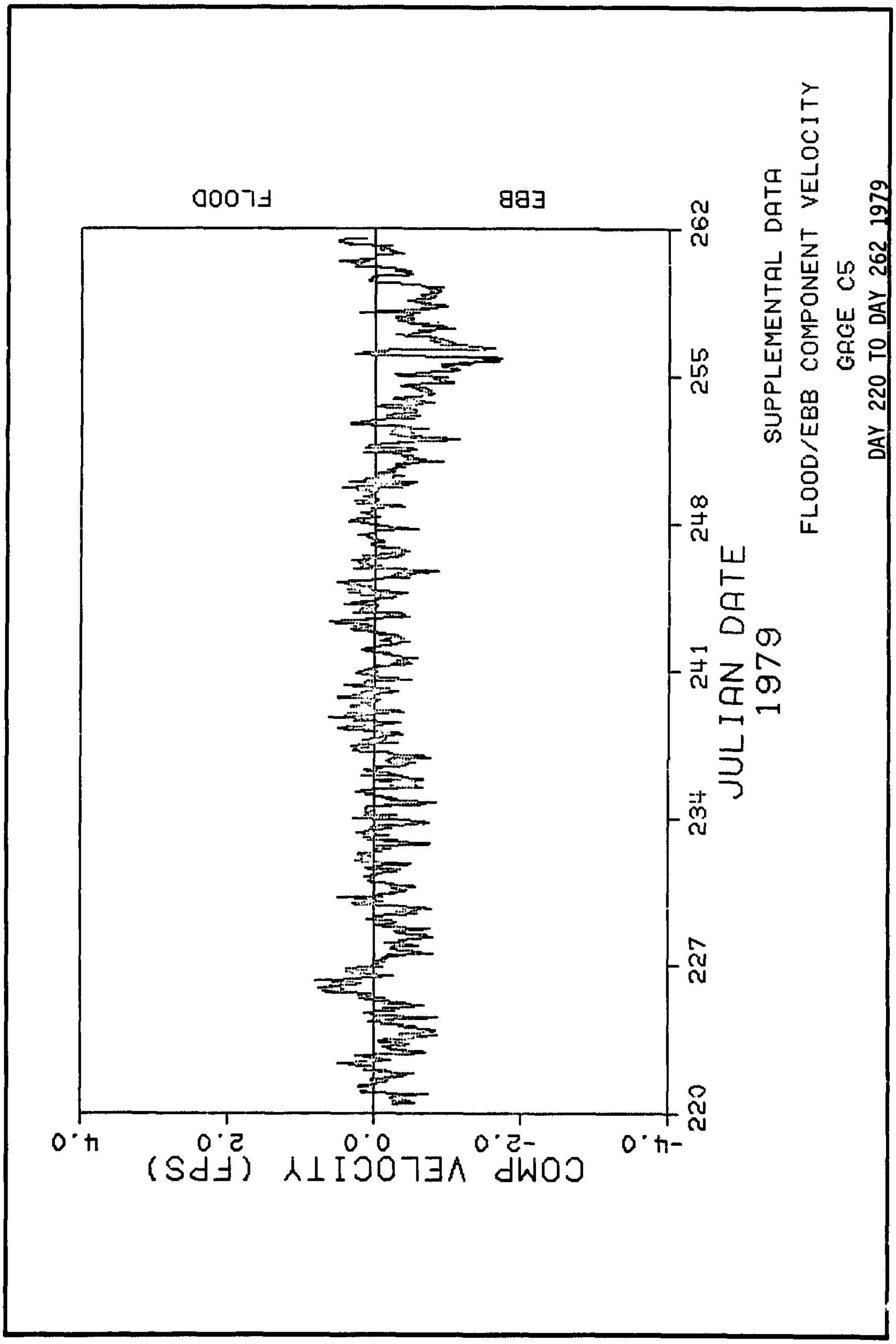
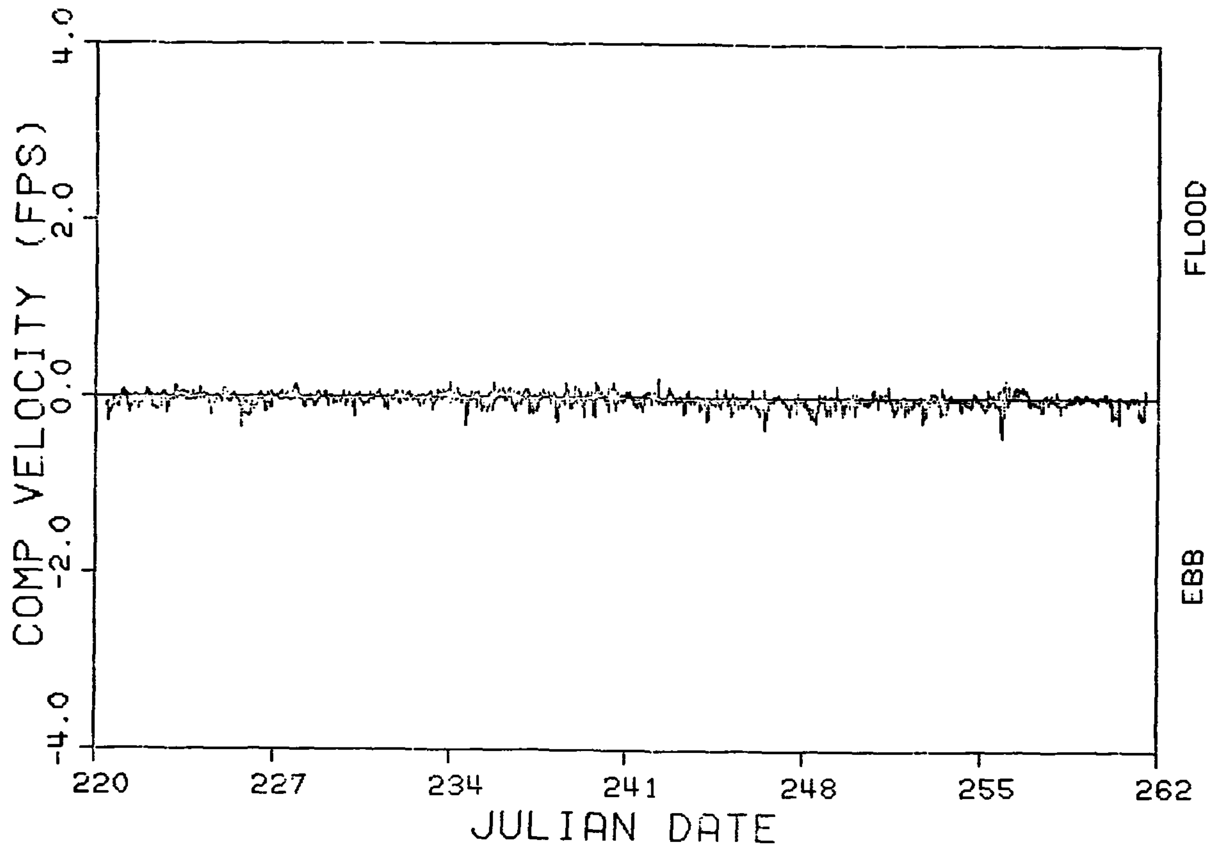
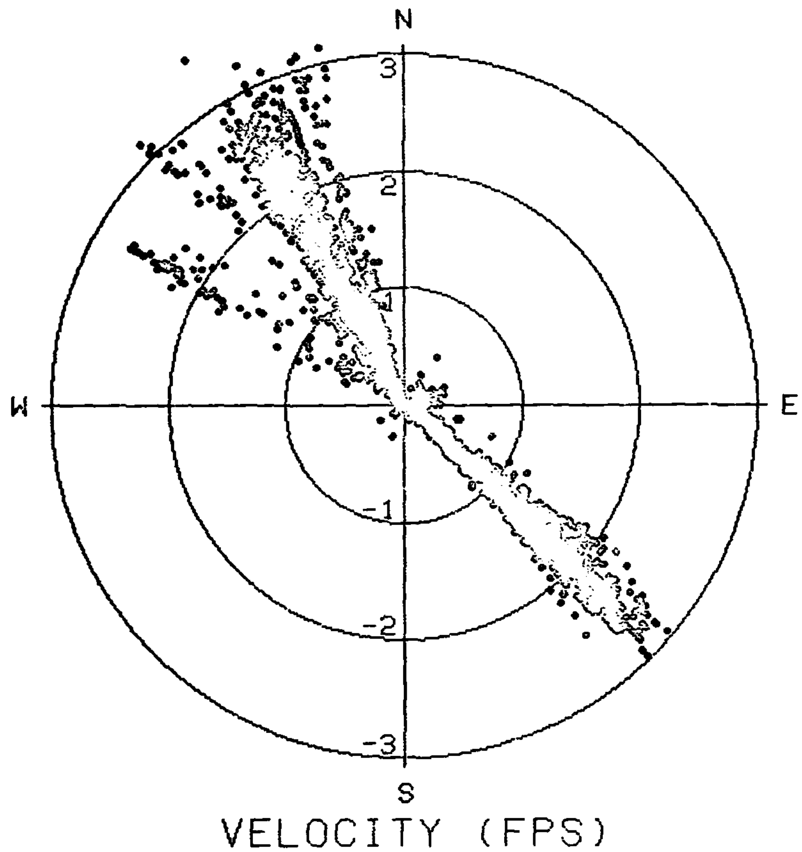

SUPPLEMENTAL DATA
FLOOD/EBB COMPONENT VELOCITY
GAGE C5
DAY 220 TO DAY 262 1979
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1979
220
227
234
241
248
255
262

PLATE B5



SUPPLEMENTAL DATA
FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE C5
DAY 220 TO DAY 262 1979

PLATE B6



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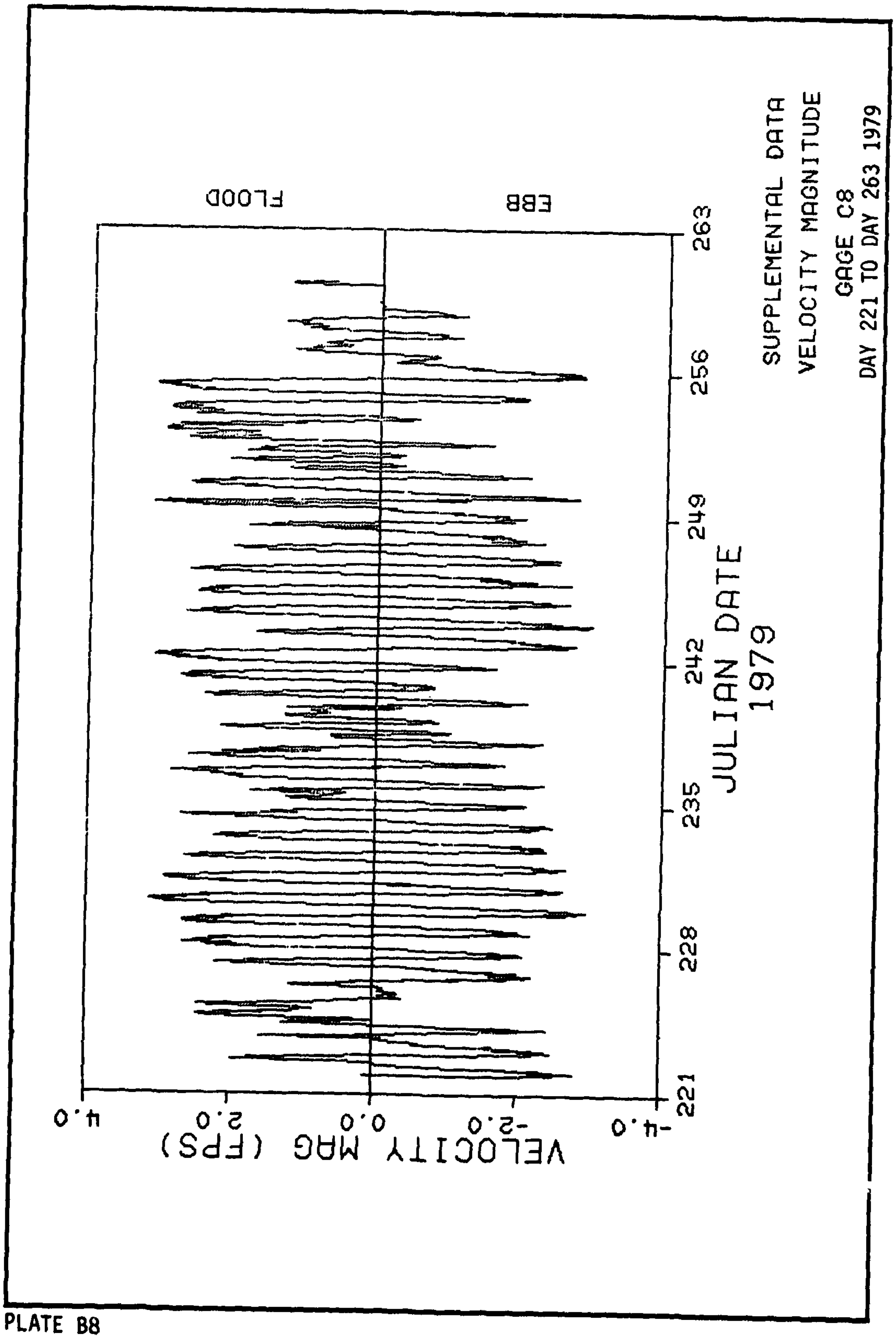
GAGE C8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DAY 221 TO DAY 263 1979
FLOOD
EBB
JULIAN DATE
1979
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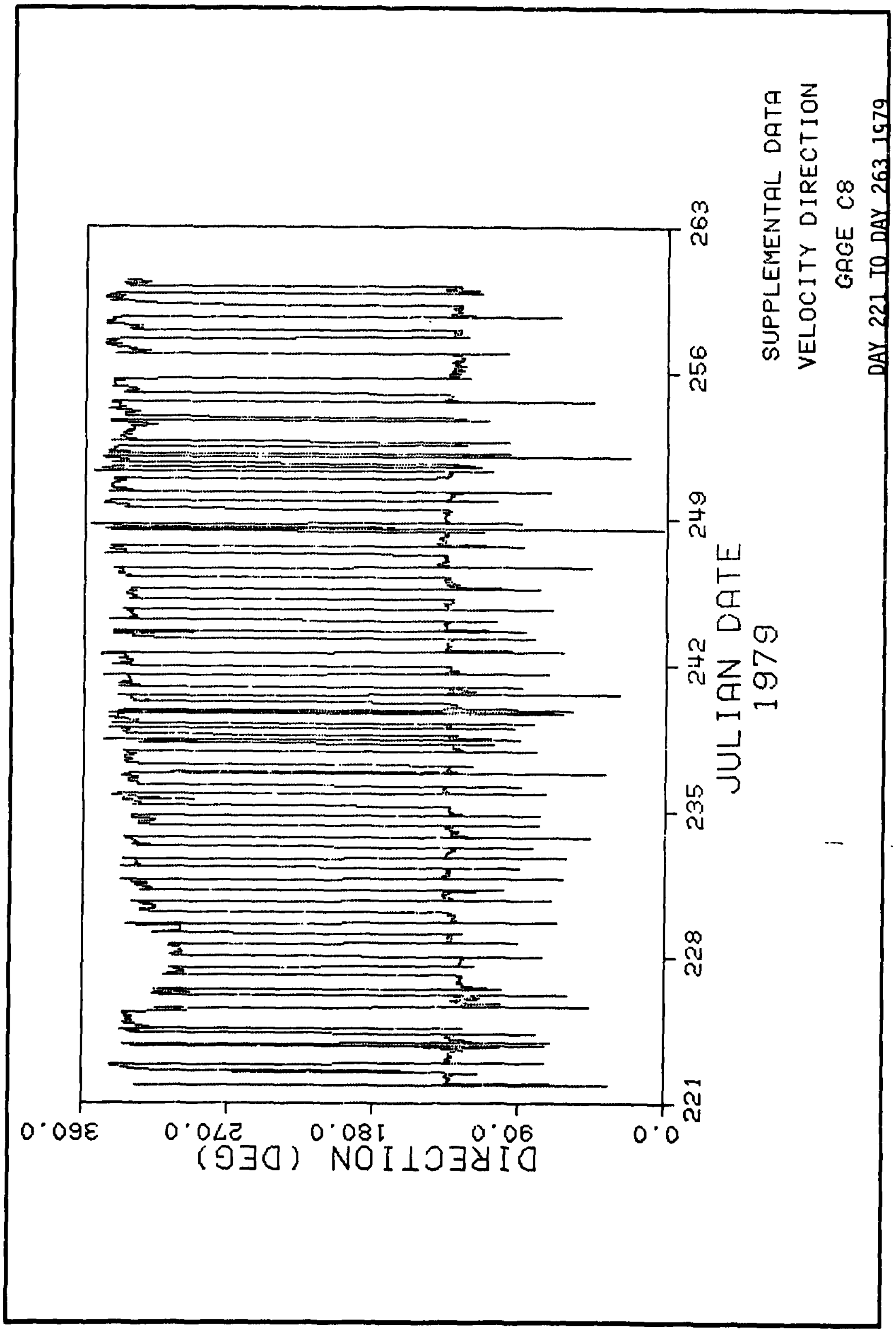
221
228
235
242
249
256
263

PLATE B8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GAGE C8
DAY 221 TO DAY 263 1979
JULIAN DATE
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228
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242
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256
263
DIRECTION (DEG)
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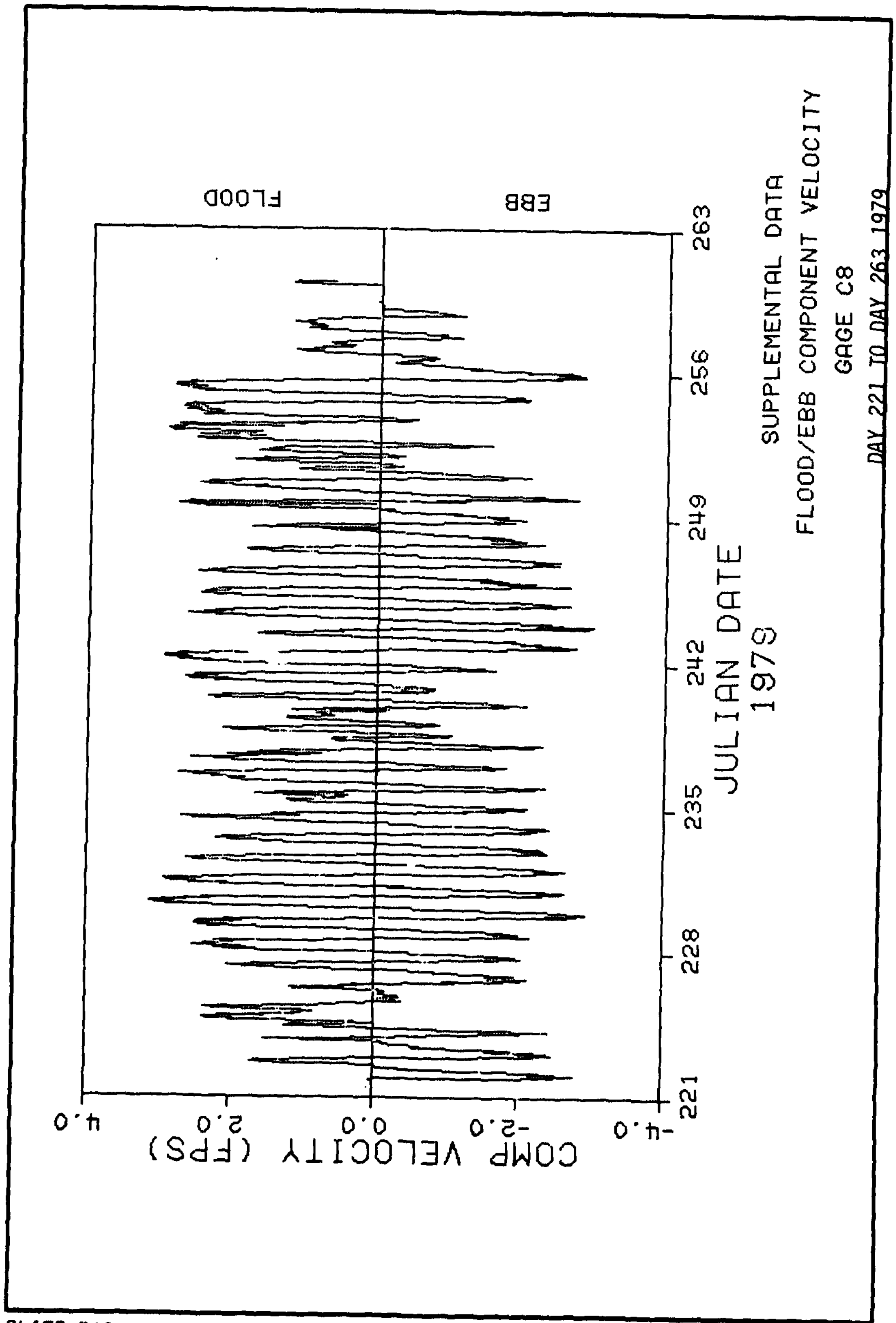
PLATE B9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GAGE C8
DAY 221 TO DAY 263 1979
FLOOD
EBB
COMP VELOCITY (FPS)
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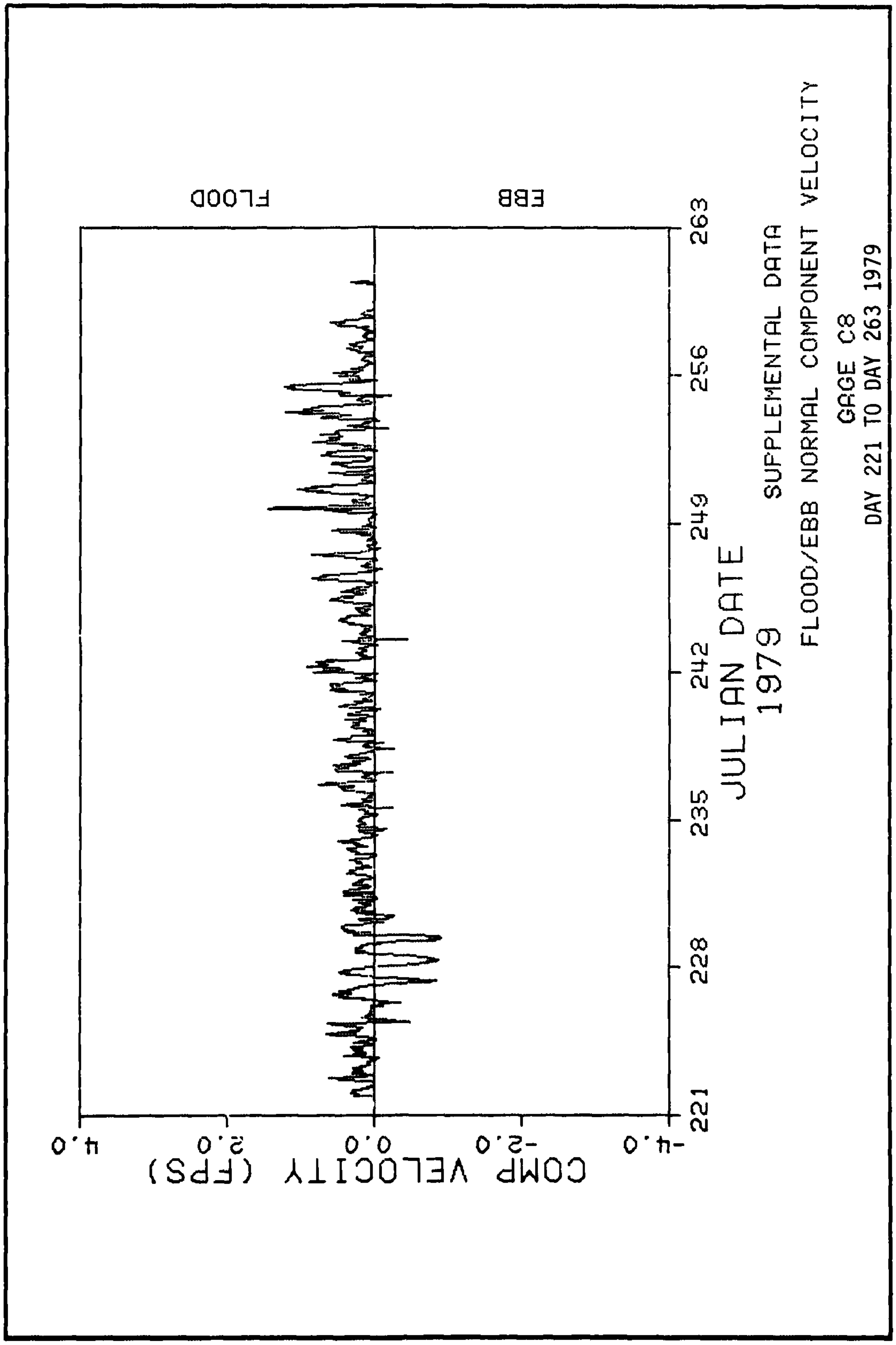
-2.0
-4.0
JULIAN DATE
1979
221
228
235
242
249
256
263

PLATE B10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GAGE C8
DAY 221 TO DAY 263 1979
FLOOD
EBB
COMP VELOCITY (FPS)
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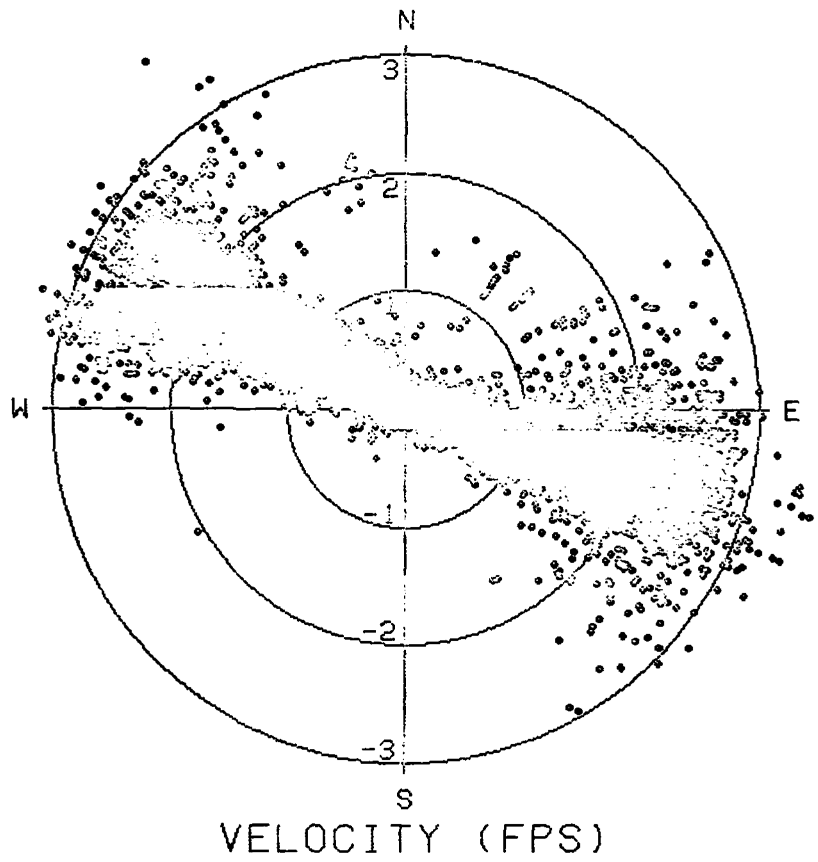
-4.0
JULIAN DATE
1979
221
228
235
242
249
256
263

PLATE B11



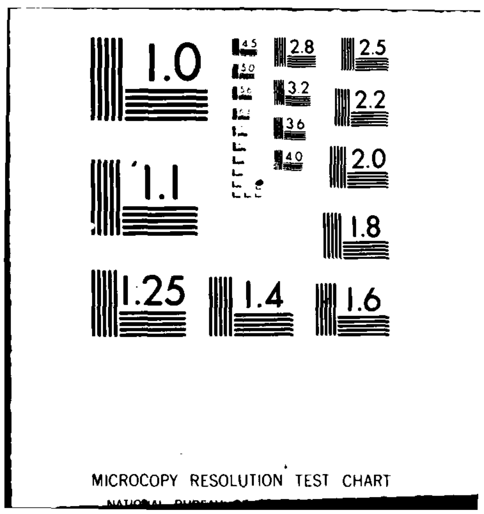
VELOCITY DATA SUMMARY
GAGE C10

PLATE B12

AD-A112 996 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG--ETC F/G 8/8
LAKE PONTCHARTRAIN AND VICINITY HURRICANE PROTECTION PLAN. REPO--ETC(U)
JAN 82 D G OUTLAW

UNCLASSIFIED WES/TR/HL-82-2-1 NL

5 of 7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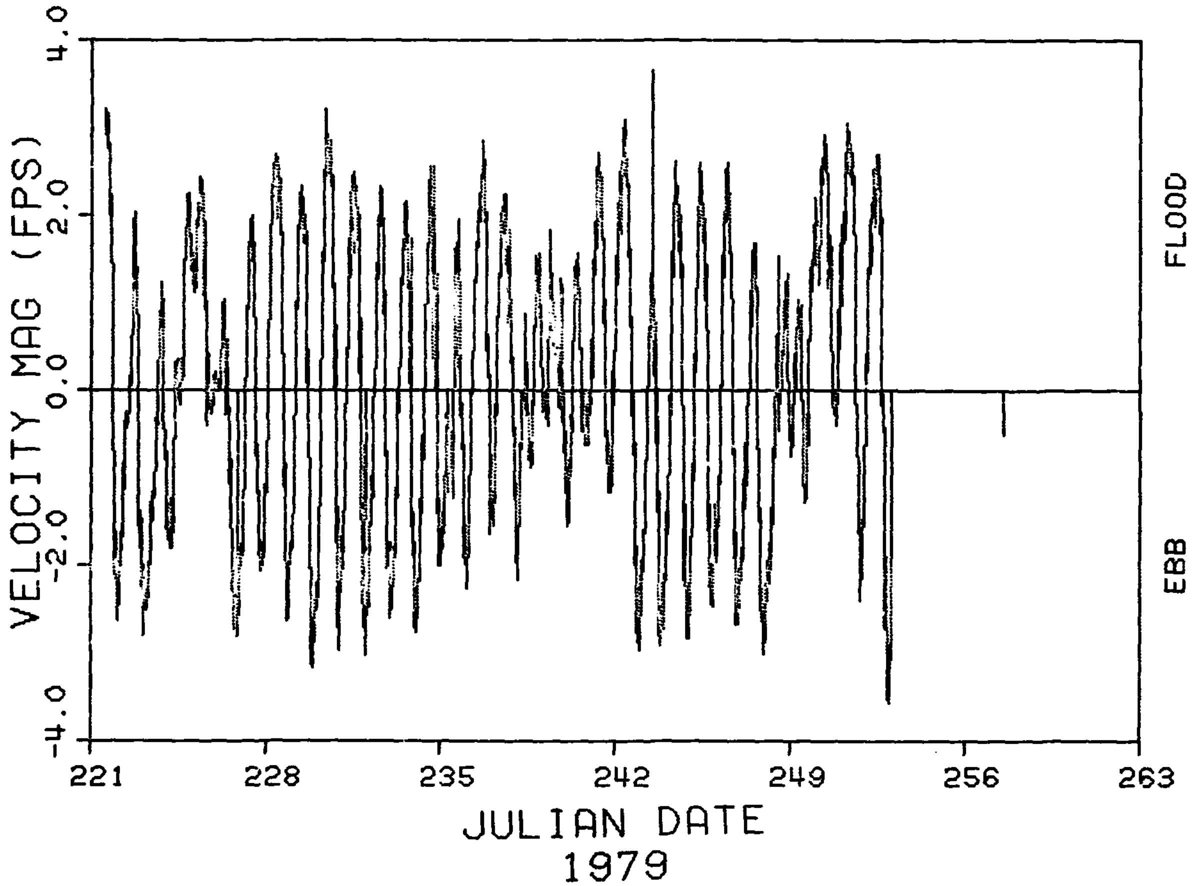
1.6
MICROCOPY RESOLUTION TEST CHART

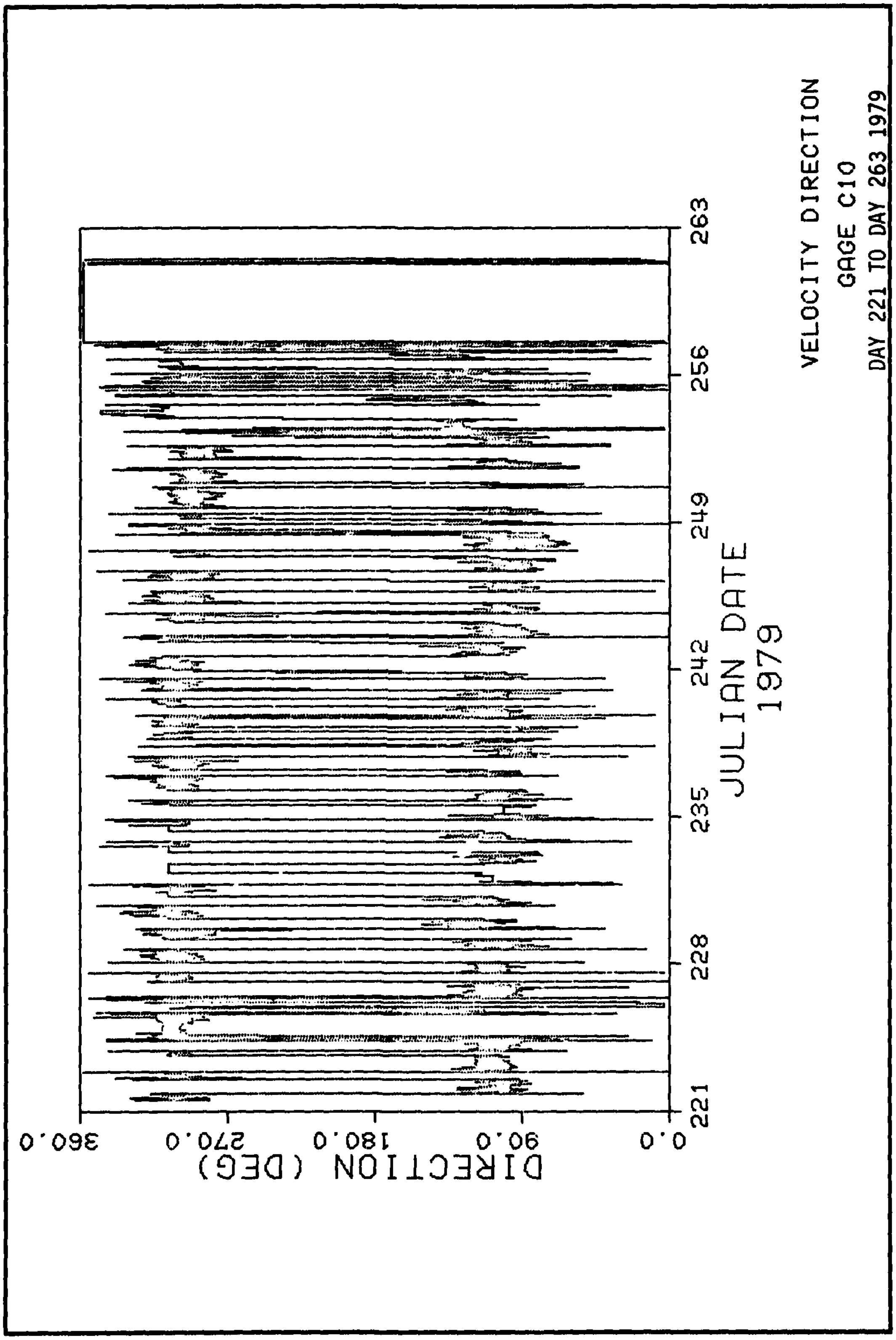


VELOCITY MAGNITUDE

GAGE C10

DAY 221 TO DAY 263 1979

PLATE B13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GAGE C10
DAY 221 TO DAY 263 1979
JULIAN DATE
1979
221
228
235
242
249
256
263
DIRECTION (DEG)
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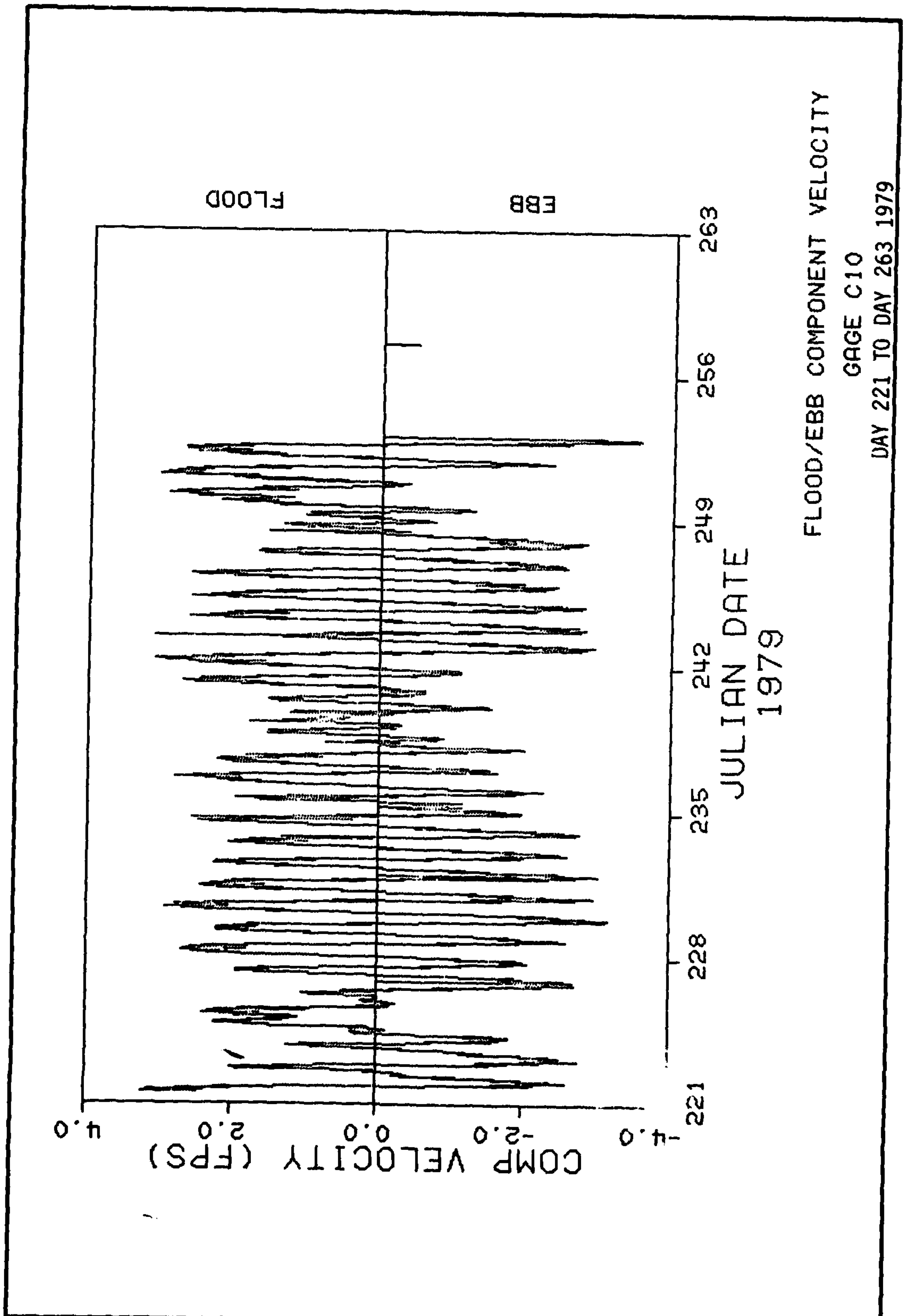
90.0
180.0
270.0
360.0

PLATE B14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GAGE C10
DAY 221 TO DAY 263 1979
FLOOD
EBB
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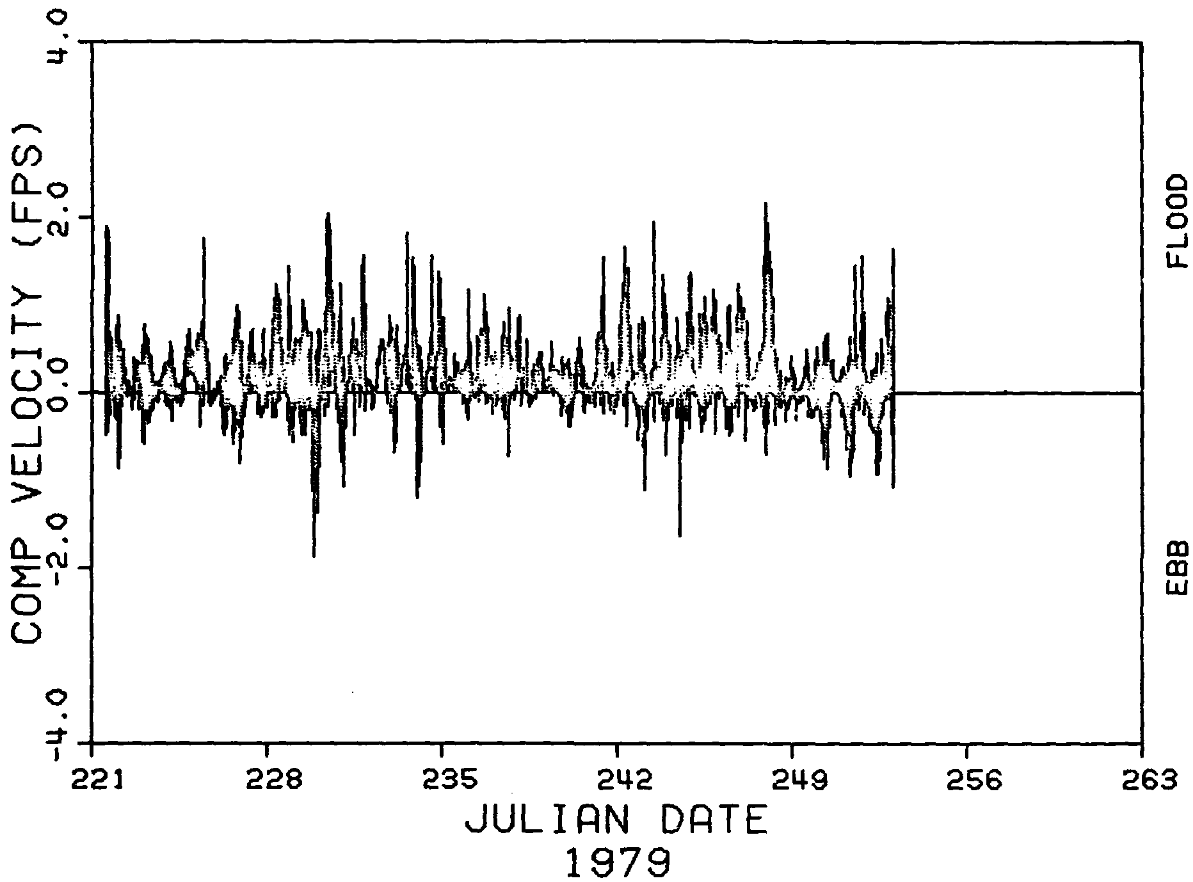
-2.0
-4.0
COMP VELOCITY (FPS)
221
228
235
242
249
256
263
JULIAN DATE
1979

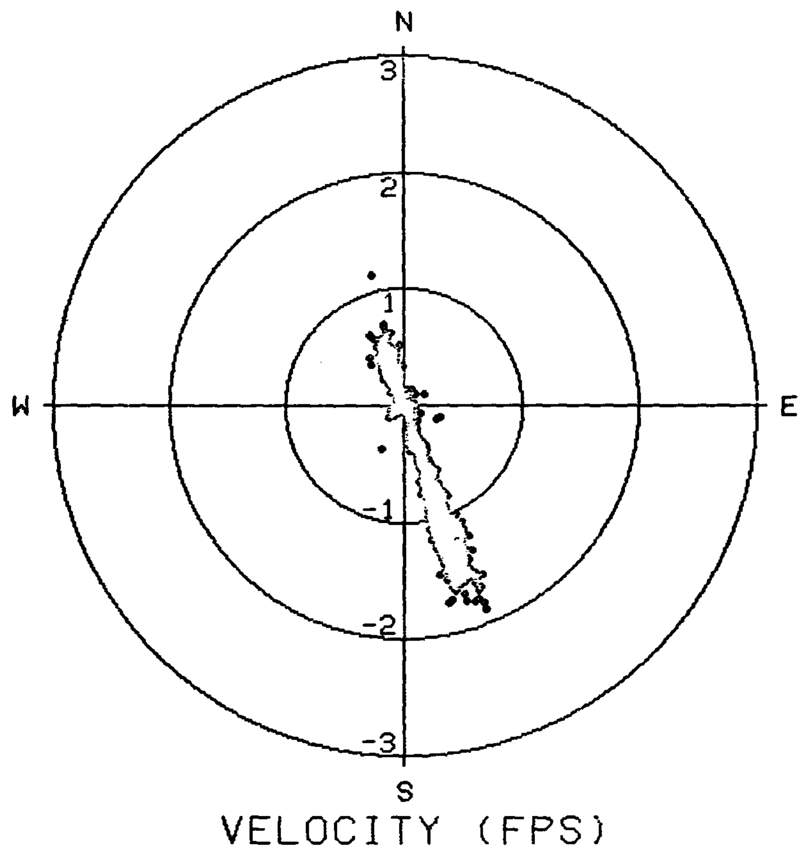


FLOOD/EBB NORMAL COMPONENT VELOCITY

GAGE C10

DAY 221 TO DAY 263 1979

PLATE B16



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VELOCITY DATA SUMMARY
GAGE C13

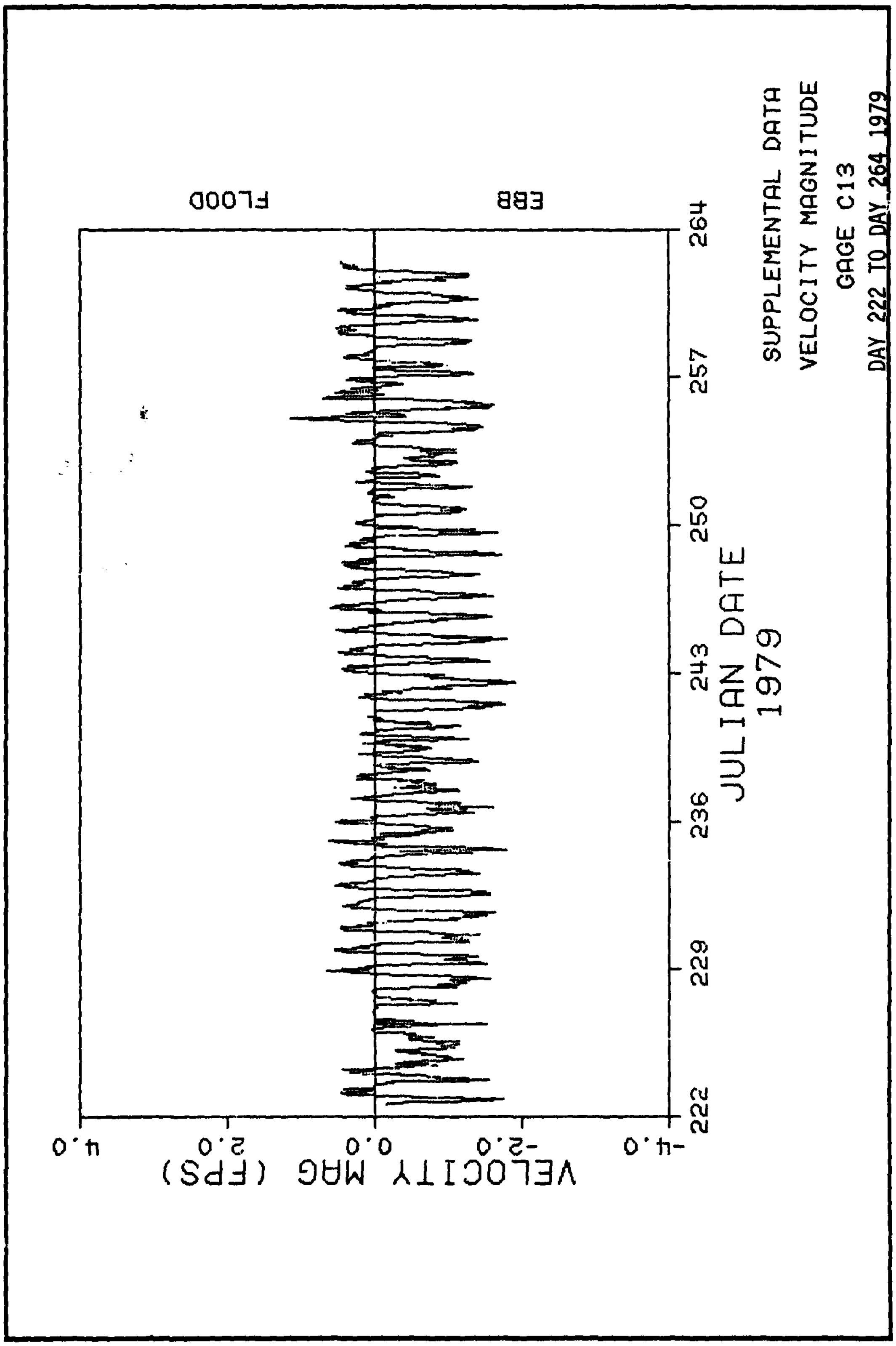
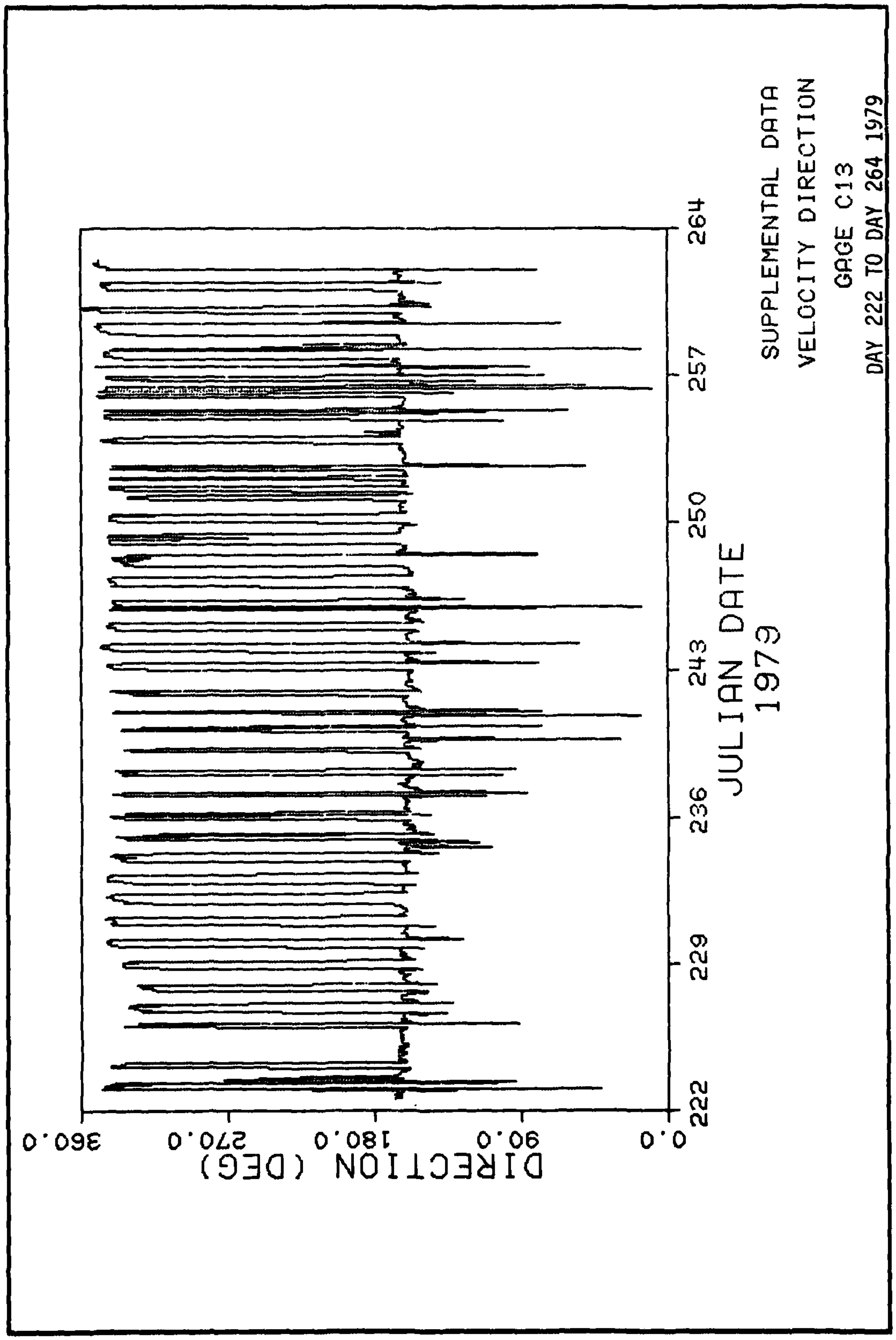

SUPPLEMENTAL DATA
VELOCITY MAGNITUDE
GAGE C13
DAY 222 TO DAY 264 1979
FLOOD
EBB
222
229
236
243
250
257
264
JULIAN DATE
1979
4.0
2.0
0.0
-2.0
-4.0
VELOCITY MAG (FPS)

PLATE B18



SUPPLEMENTAL DATA
VELOCITY DIRECTION
GAGE C13
DAY 222 TO DAY 264 1979
JULIAN DATE
1979
DIRECTION (DEG)
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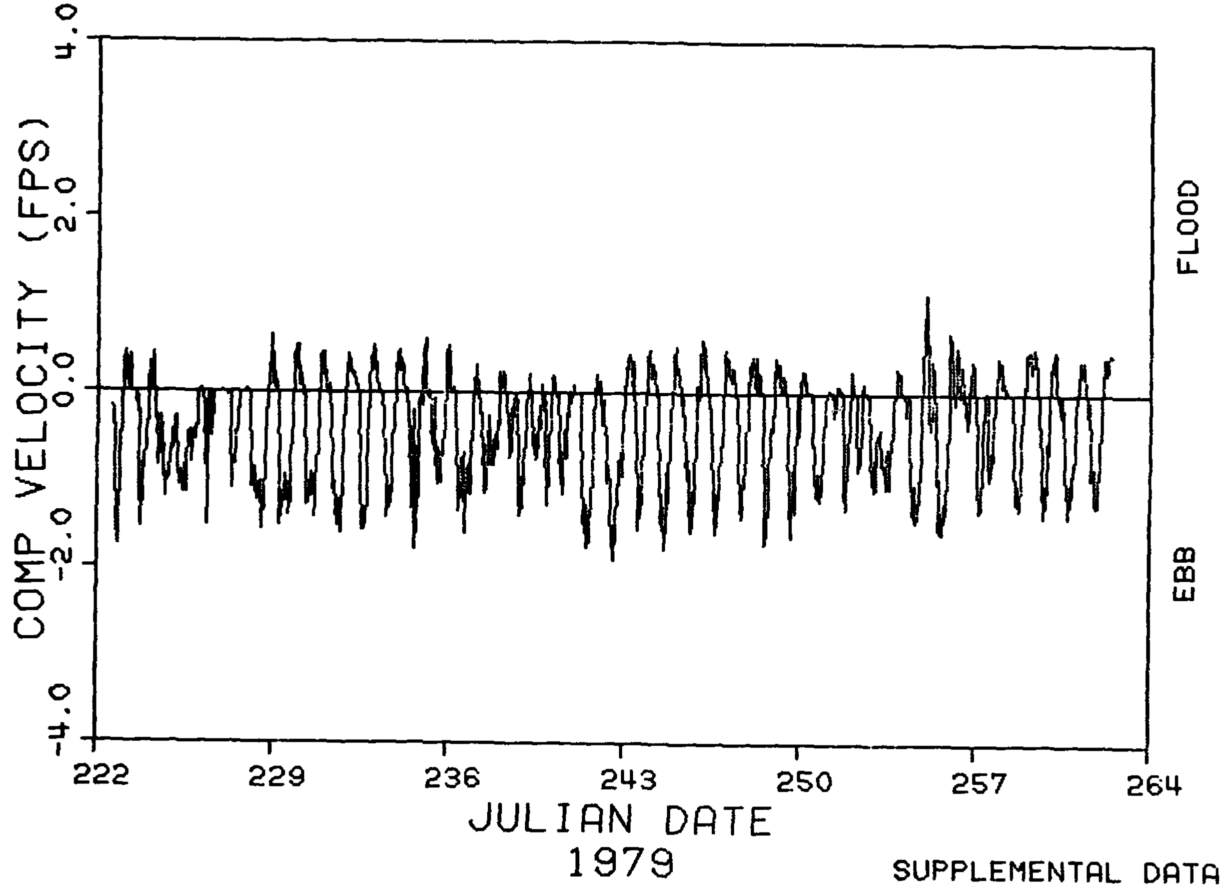
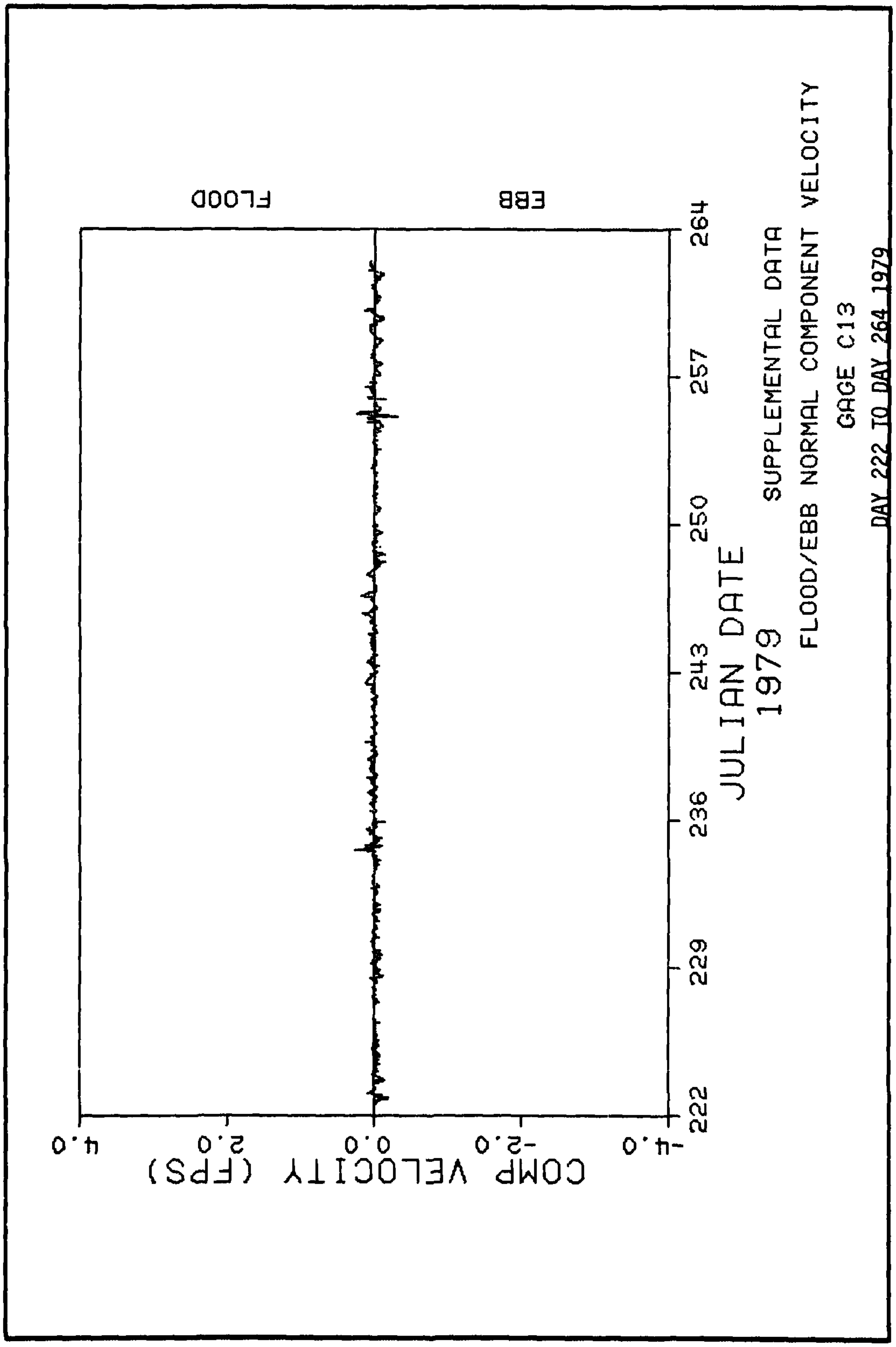
180.0
270.0
360.0
222
229
236
243
250
257
264

PLATE B19



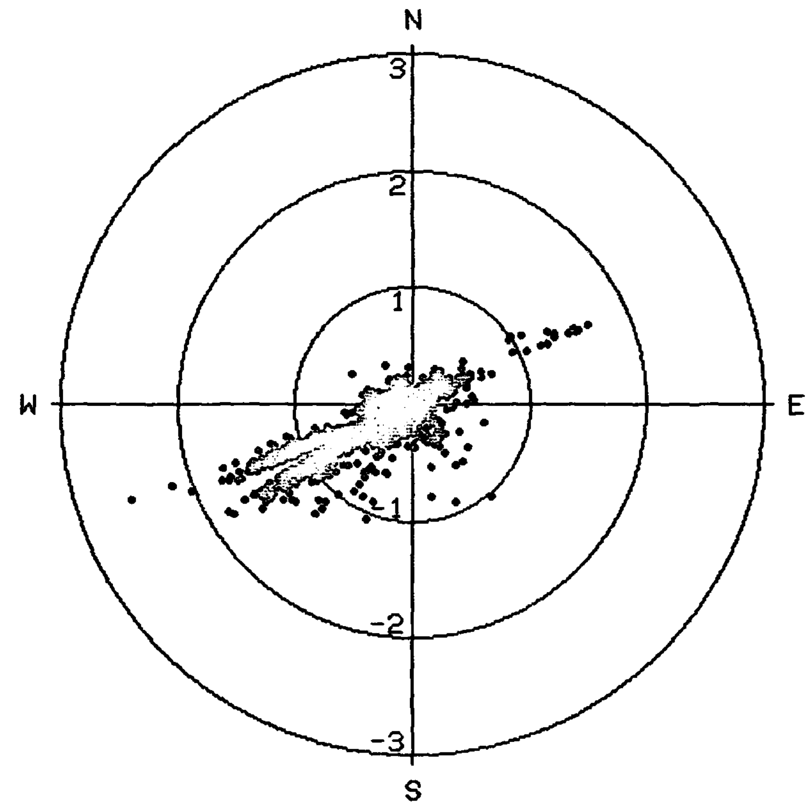
SUPPLEMENTAL DATA
FLOOD/EBB COMPONENT VELOCITY
GAGE C13
DAY 222 TO DAY 264 1979

PLATE B20



SUPPLEMENTAL DATA
FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE C13
DAY 222 TO DAY 264 1979
FLOOD
EBB
COMP VELOCITY (FPS)
4.0
2.0
0.0
-2.0
-4.0
JULIAN DATE
1979
222
229
236
243
250
257
264

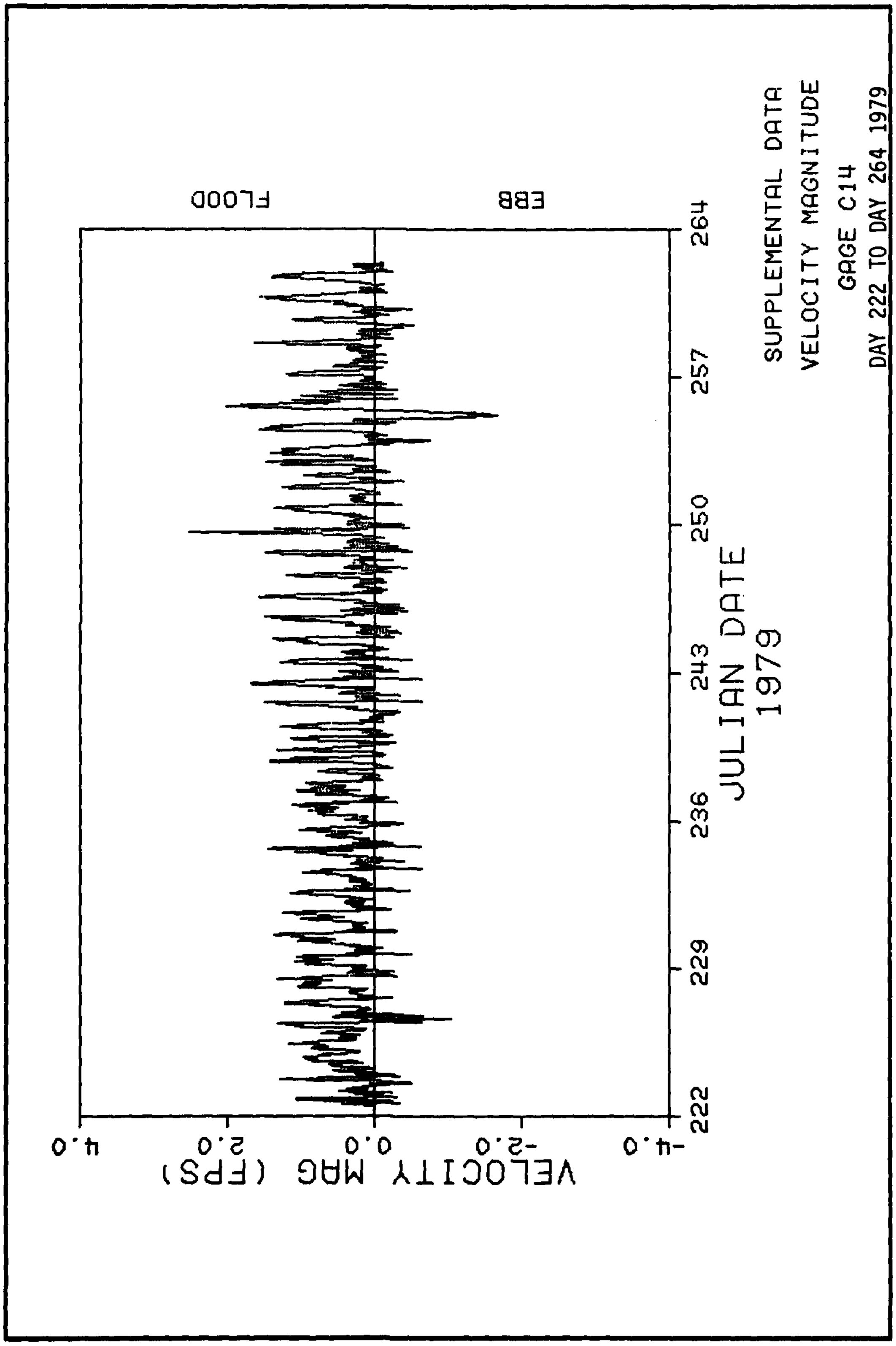
PLATE B21



VELOCITY (FPS)

SUPPLEMENTAL DATA
VELOCITY DATA SUMMARY
GAGE C14

PLATE B22


SUPPLEMENTAL DATA
VELOCITY MAGNITUDE
GAGE C14
DAY 222 TO DAY 264 1979
FLOOD
EBB
VELOCITY MAG (FPS)
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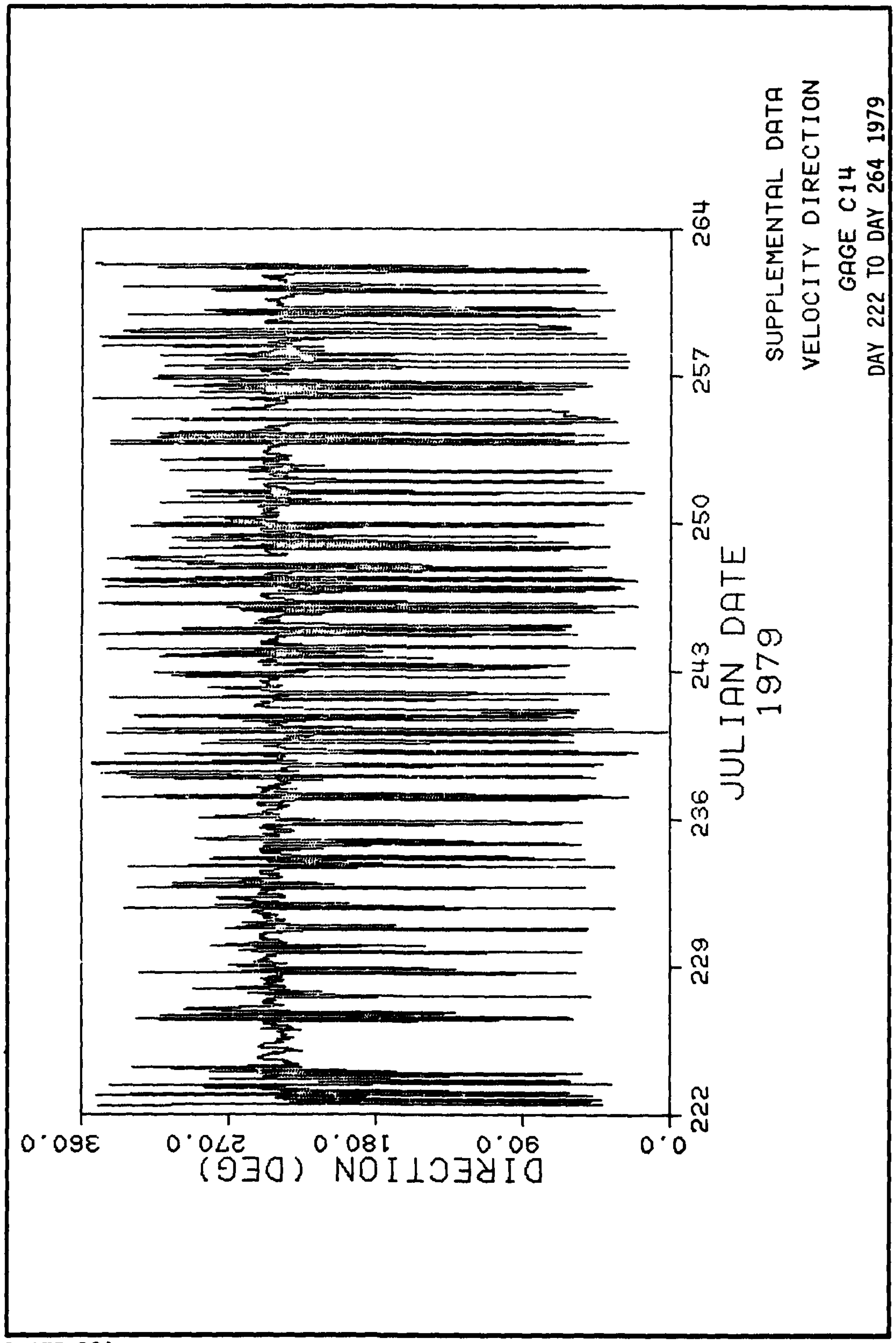
-2.0
-4.0
JULIAN DATE
1979
222
229
236
243
250
257
264

PLATE B23


SUPPLEMENTAL DATA
VELOCITY DIRECTION
GAGE C14
DAY 222 TO DAY 264 1979
JULIAN DATE
1979
DIRECTION (DEG)
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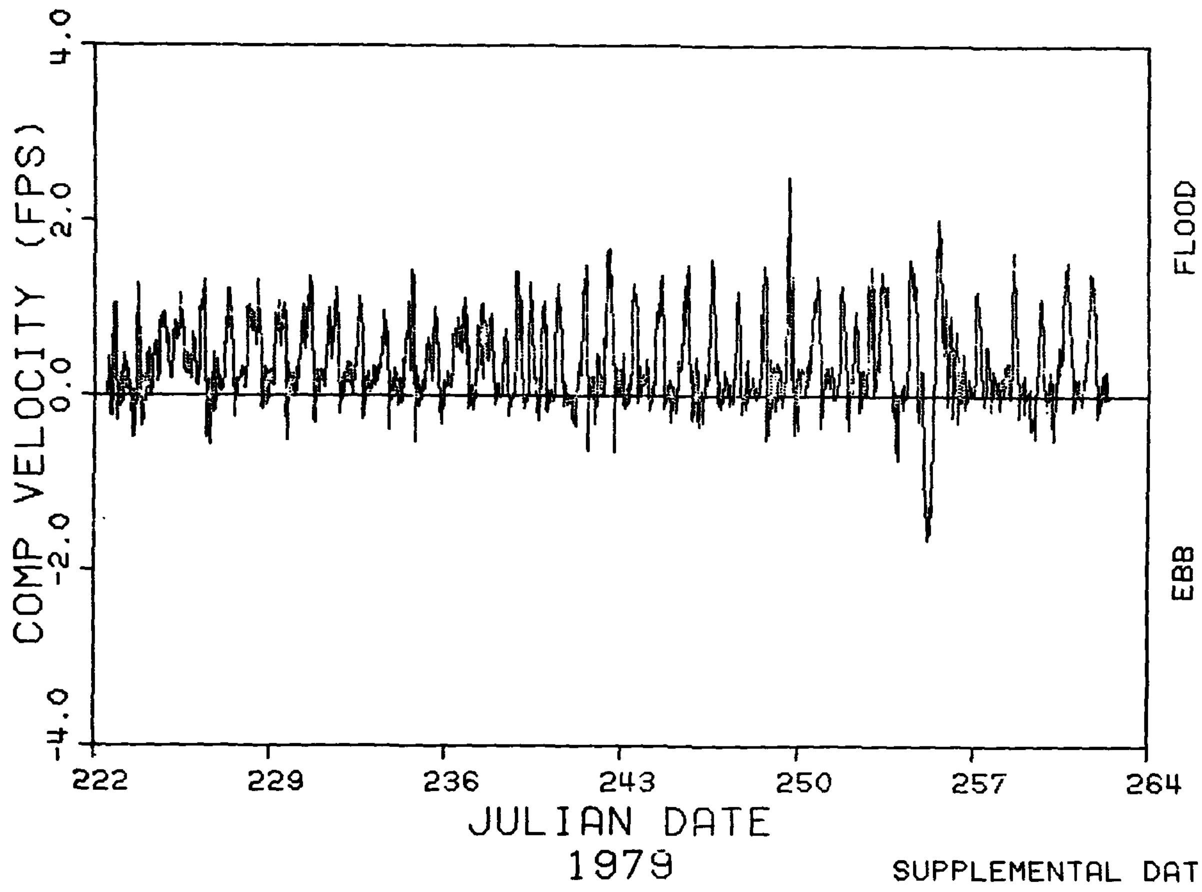
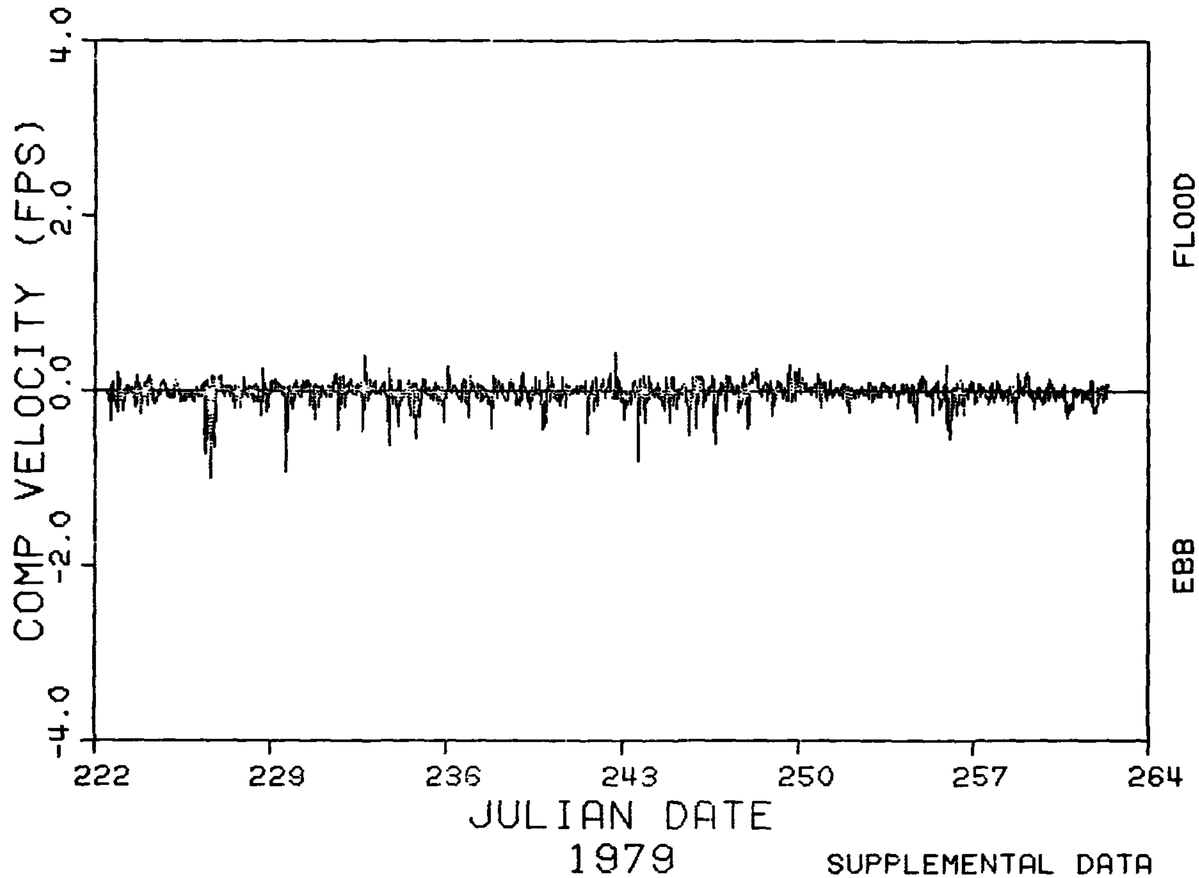
180.0
270.0
360.0
222
229
236
243
250
257
264

PLATE B24



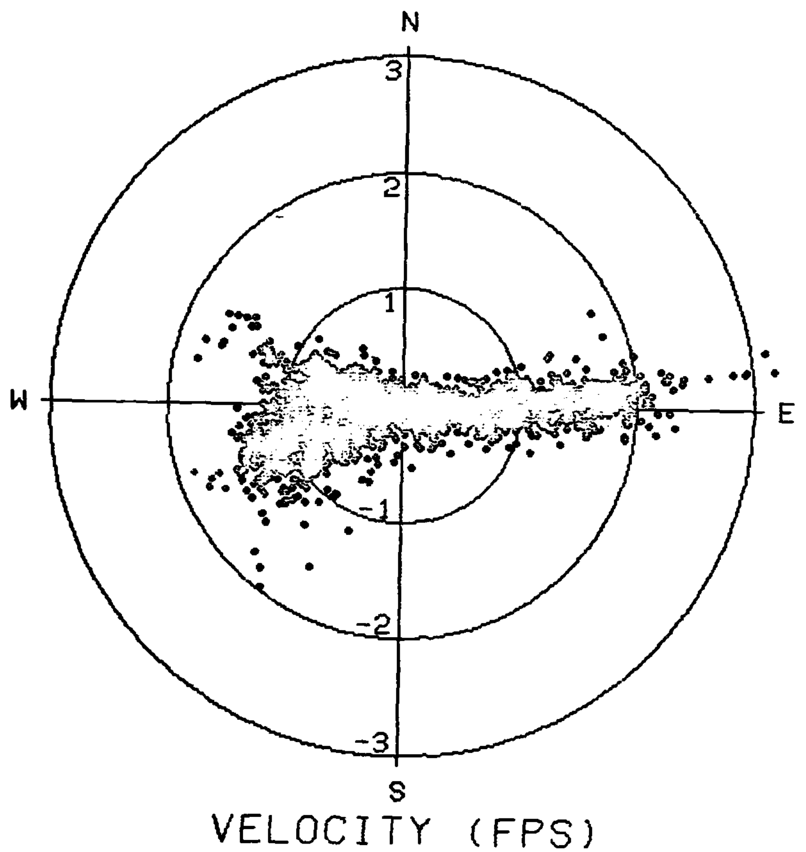
SUPPLEMENTAL DATA
FLOOD/EBB COMPONENT VELOCITY
GAGE C14
DAY 222 TO DAY 264 1979

PLATE B25

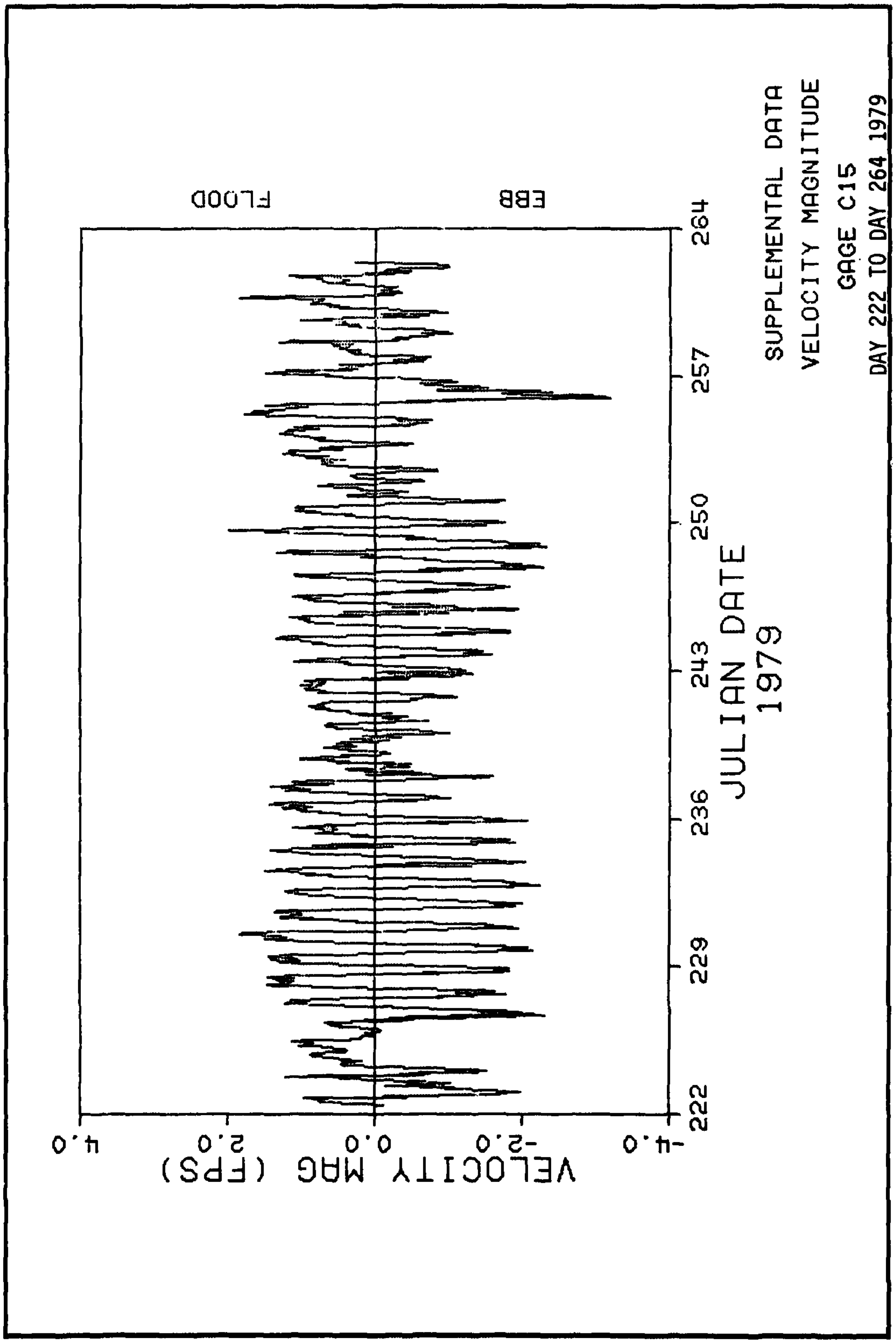


SUPPLEMENTAL DATA
FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE C14
DAY 222 TO DAY 264 1979

PLATE B26



SUPPLEMENTAL DATA
VELOCITY DATA SUMMARY
GAGE C15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GAGE C15
DAY 222 TO DAY 264 1979
FLOOD
EBB
VELOCITY MAG (FPS)
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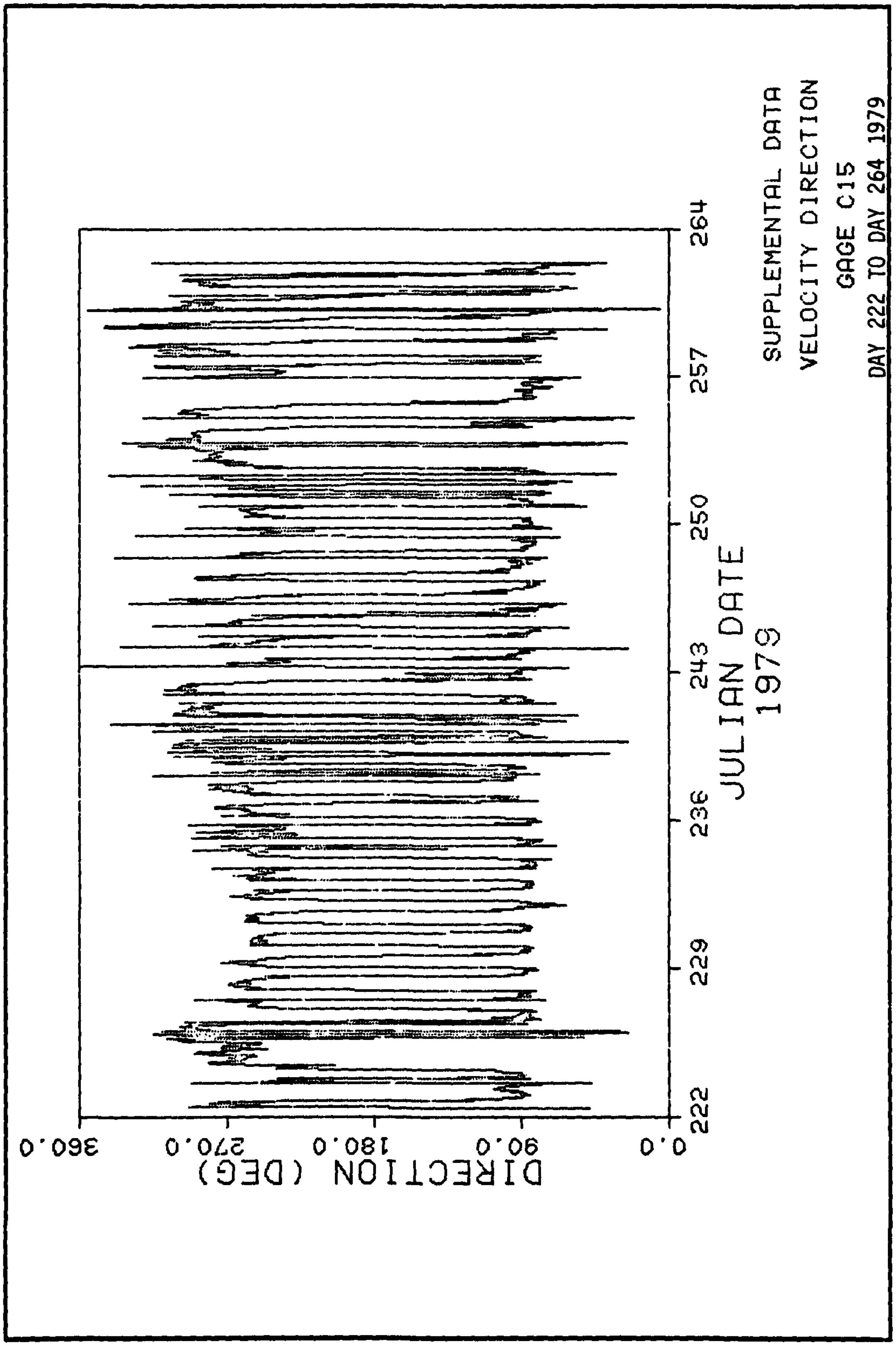
-4.0
JULIAN DATE
1979
222
229
236
243
250
257
264

PLATE B28



SUPPLEMENTAL DATA
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GAGE C15
DAY 222 TO DAY 264 1979
JULIAN DATE
1979
222
229
236
243
250
257
264
DIRECTION (DEG)
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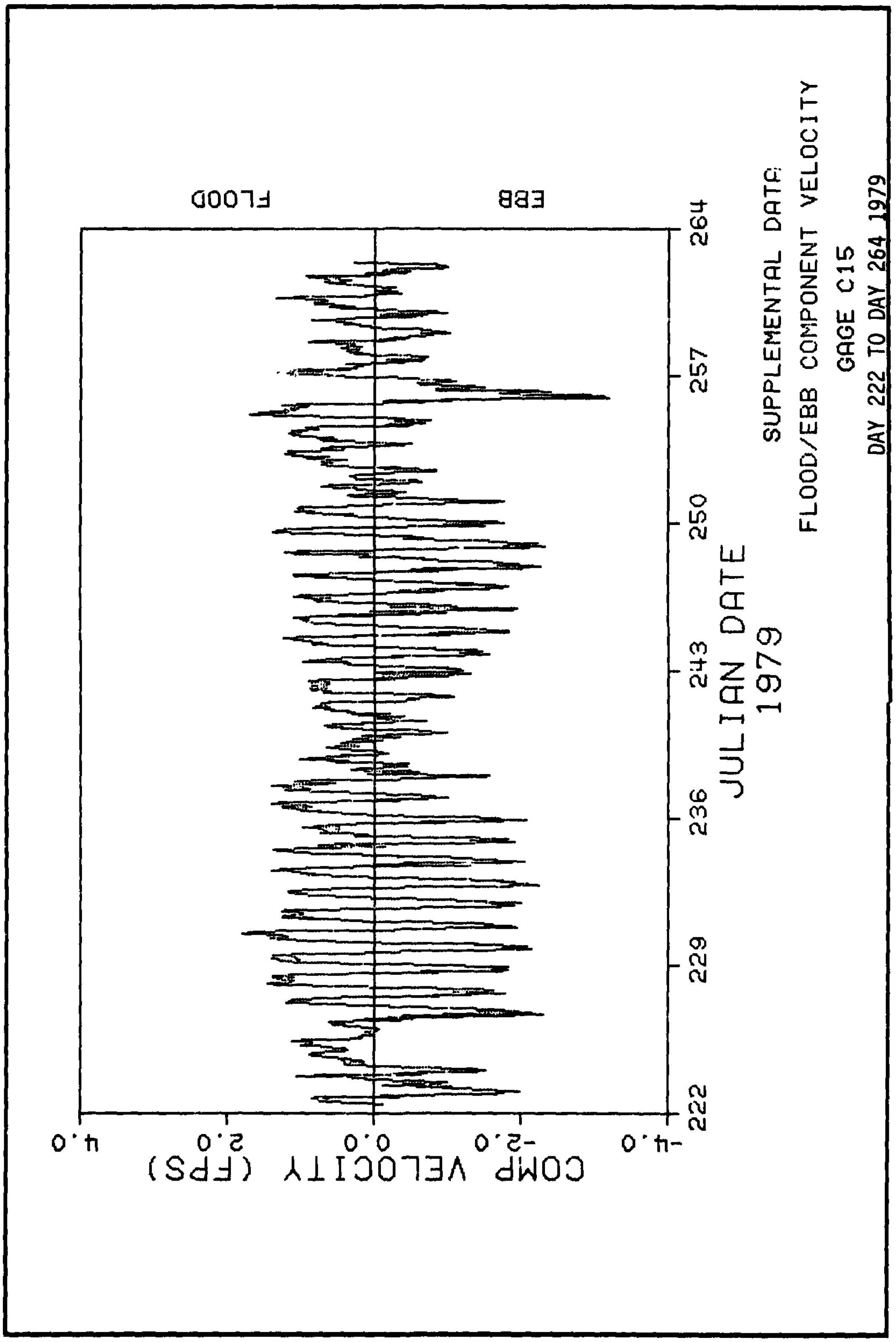
180.0
270.0
360.0

PLATE B29



SUPPLEMENTAL DATA
FLOOD/EBB COMPONENT VELOCITY
GAGE C15
DAY 222 TO DAY 264 1979
FLOOD
EBB
COMP VELOCITY (FPS)
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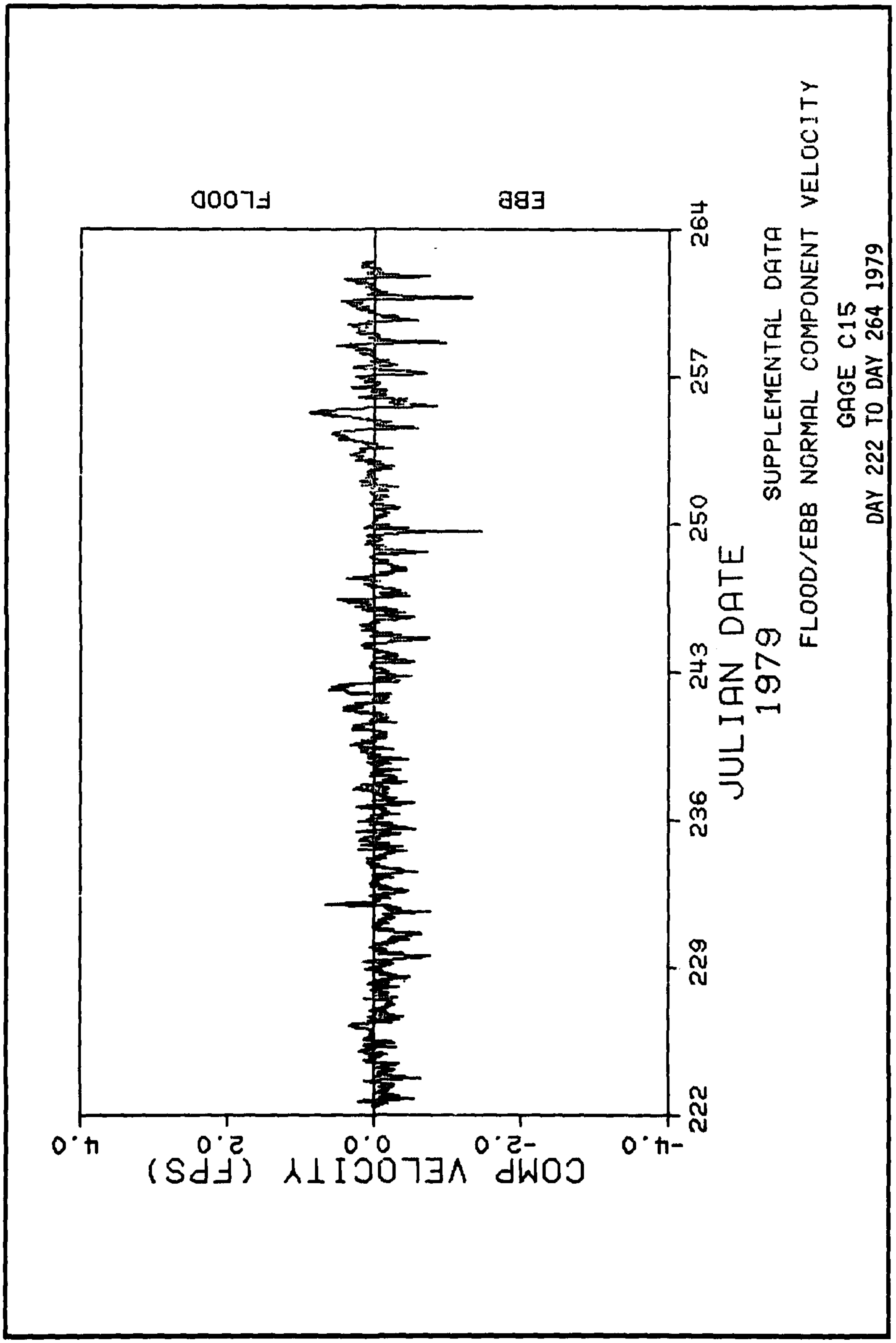
-2.0
-4.0
JULIAN DATE
1979
222
229
236
243
250
257
264

PLATE B30


SUPPLEMENTAL DATA
FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE C15
DAY 222 TO DAY 264 1979
JULIAN DATE
1979
COMP VELOCITY (FPS)
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EBB
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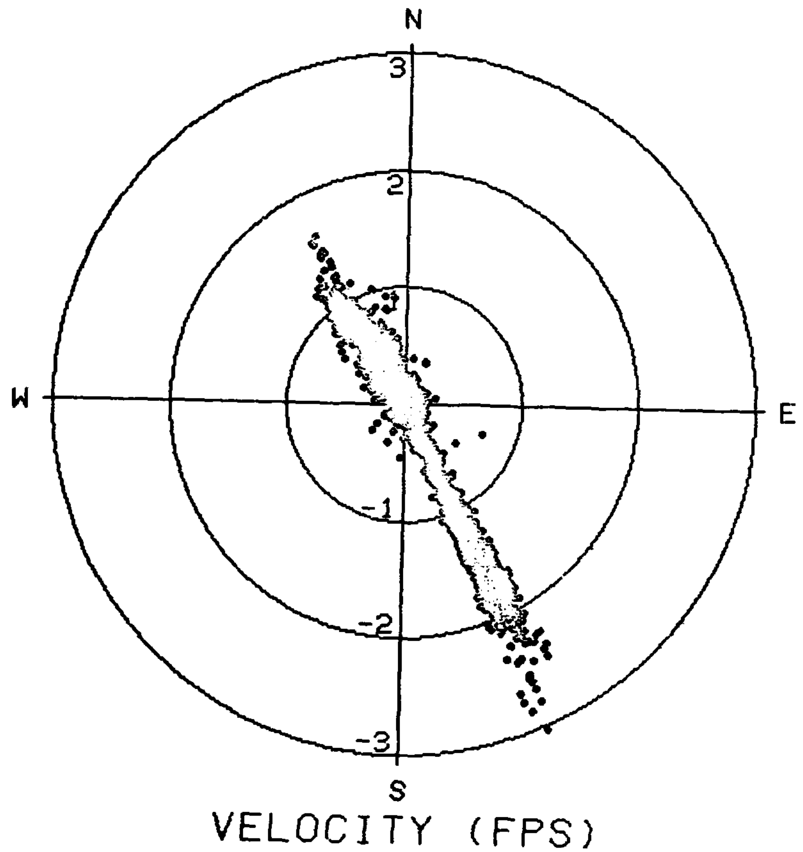
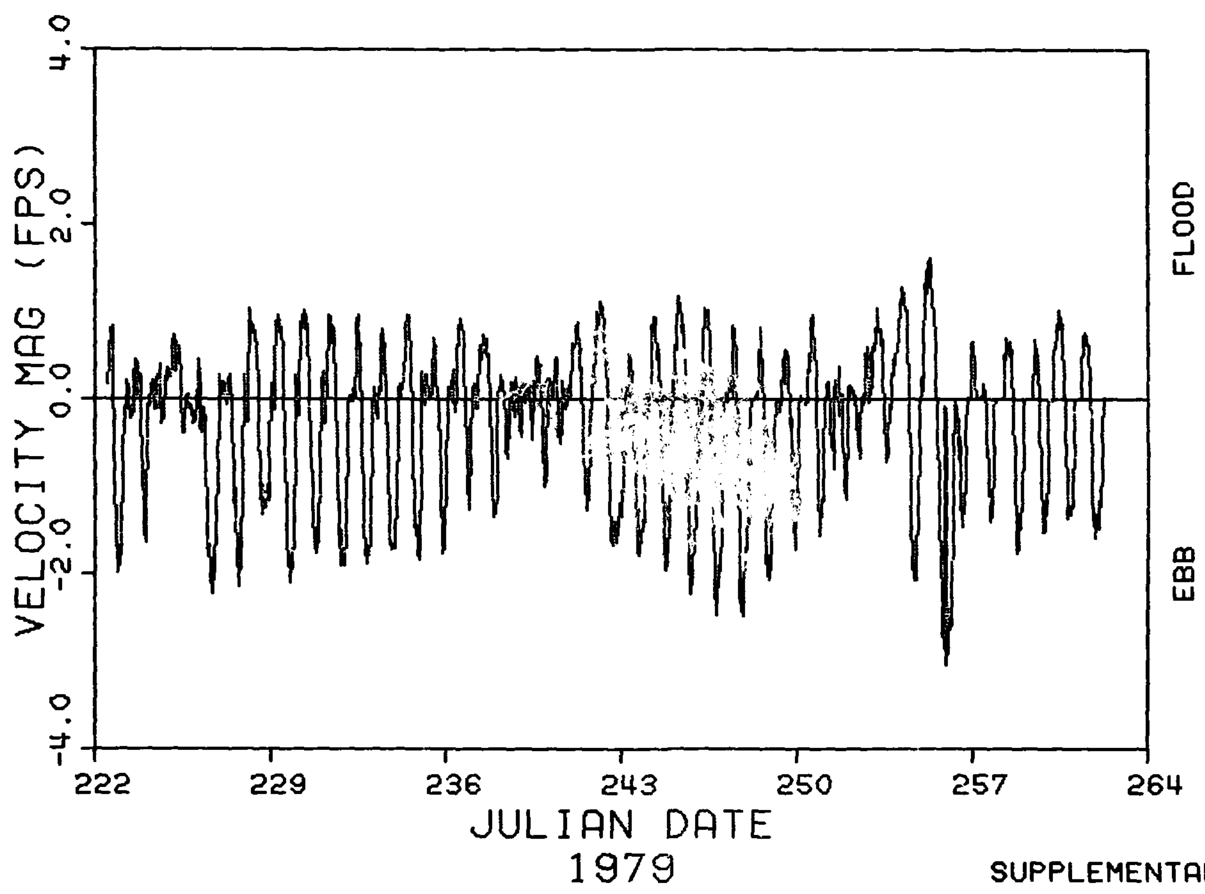
0.0
-2.0
-4.0
222
229
236
243
250
257
264

PLATE B31

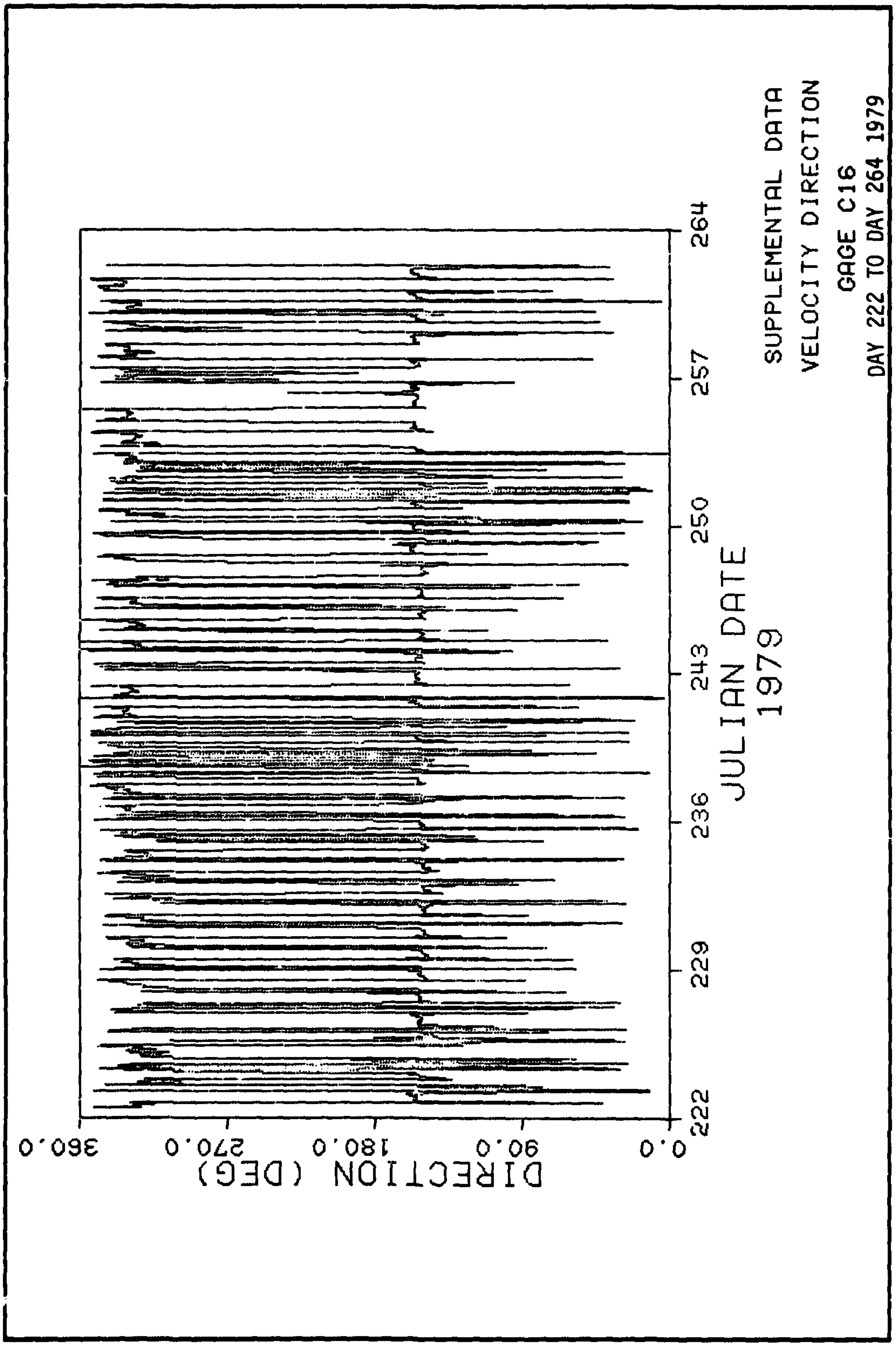


SUPPLEMENTAL DATA
VELOCITY DATA SUMMARY
GAGE C16

PLATE B32



SUPPLEMENTAL DATA
VELOCITY MAGNITUDE
GAGE C16
DAY 222 TO DAY 264 1979



SUPPLEMENTAL DATA
VELOCITY DIRECTION
GAGE C16
DAY 222 TO DAY 264 1979
DIRECTION (DEG)
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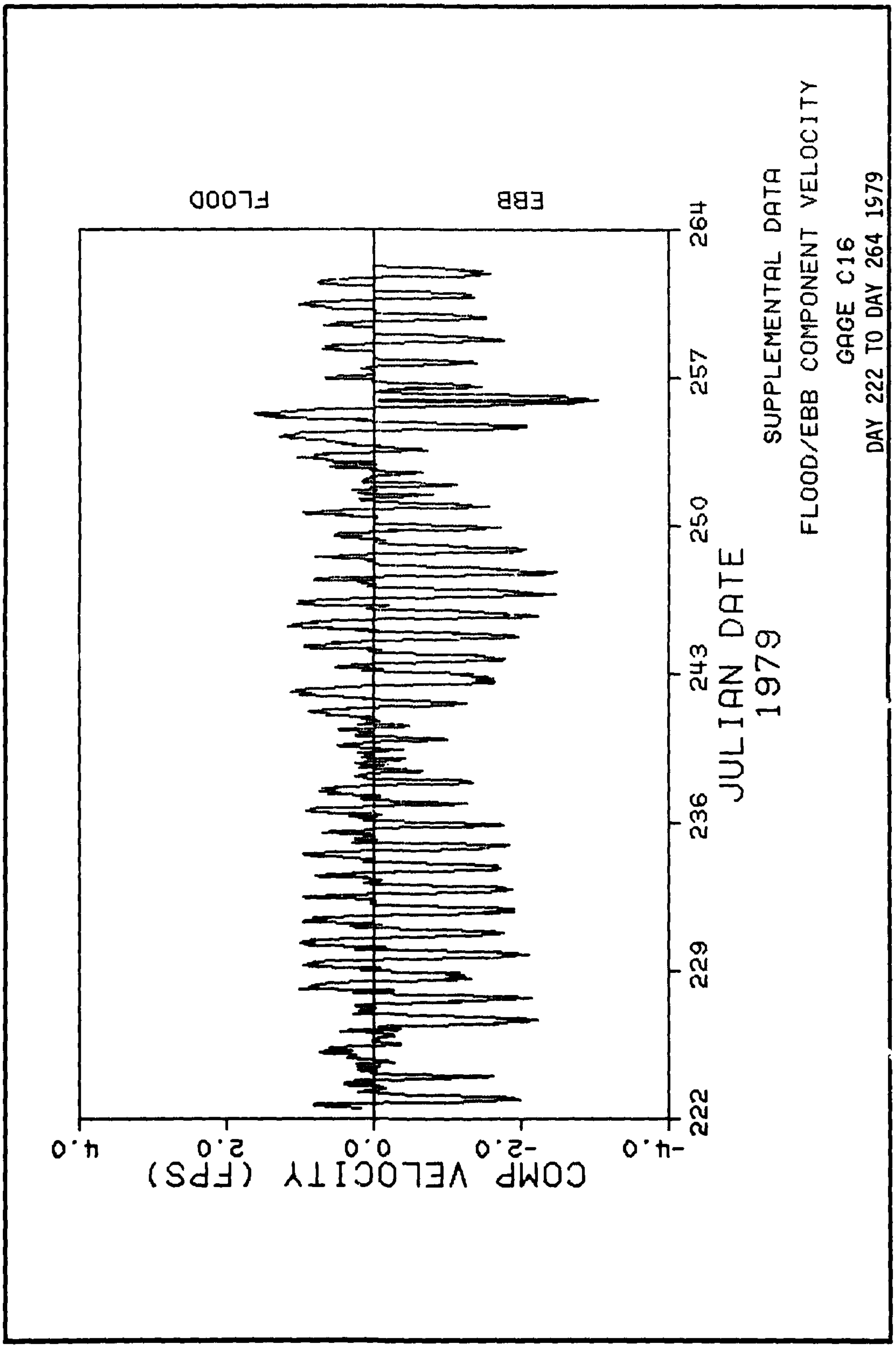
270.0
360.0
JULIAN DATE
1979
222
229
236
243
250
257
264

PLATE B34



SUPPLEMENTAL DATA
FLOOD/EBB COMPONENT VELOCITY
GAGE C16
DAY 222 TO DAY 264 1979
FLOOD
EBB
COMP VELOCITY (FPS)
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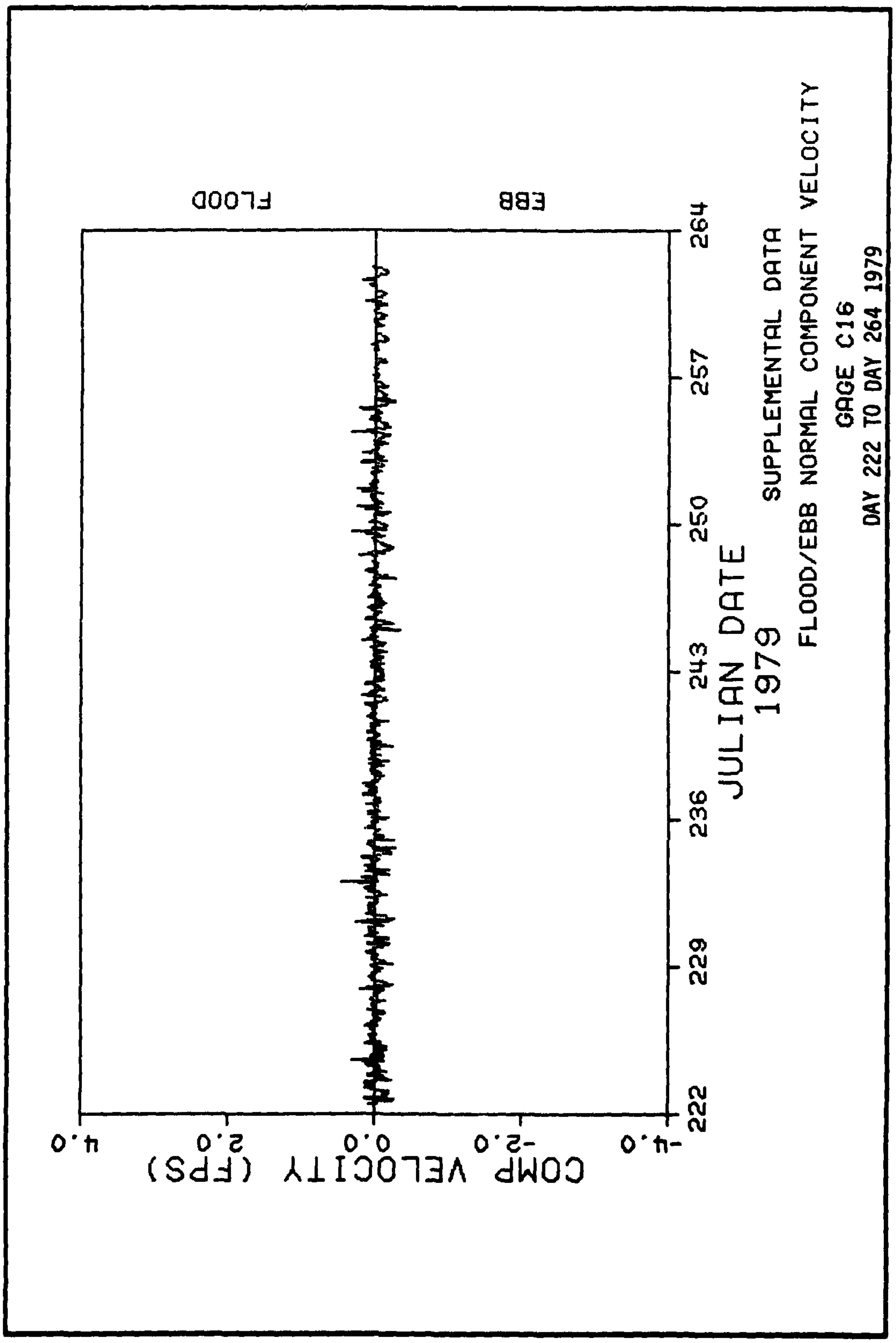
-2.0
-4.0
JULIAN DATE
1979
222
229
236
243
250
257
264


FLOOD
EBB
COMP VELOCITY (FPS)
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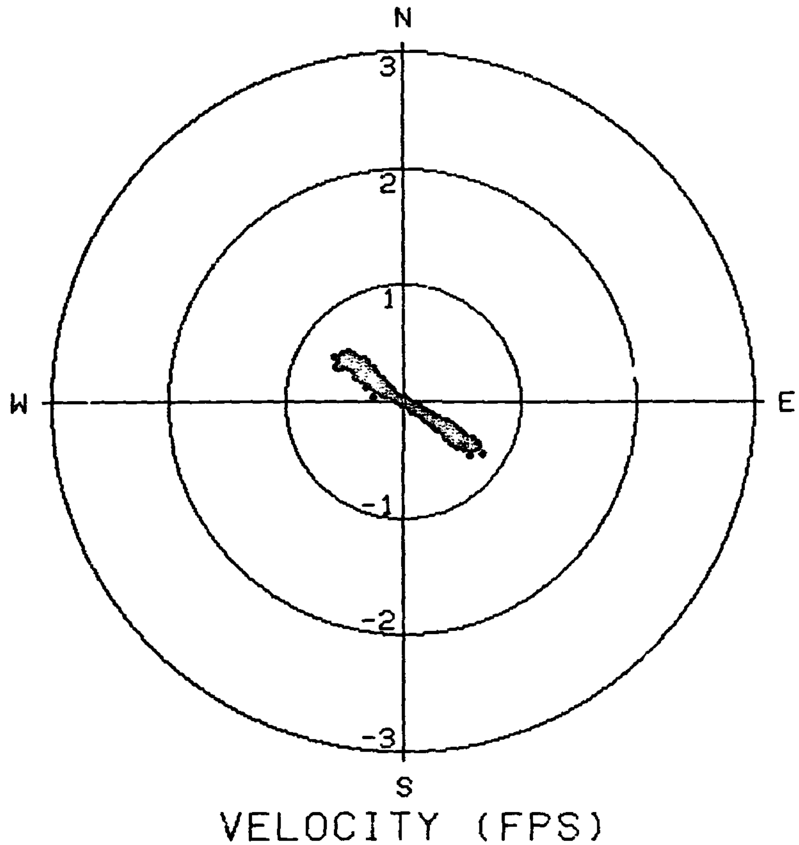
2.0
0.0
-2.0
-4.0
222
229
236
243
250
257
264
JULIAN DATE
1979
SUPPLEMENTAL DATA
FLOOD/EBB NORMAL COMPONENT VELOCITY
GAGE C16
DAY 222 TO DAY 264 1979

PLATE B36



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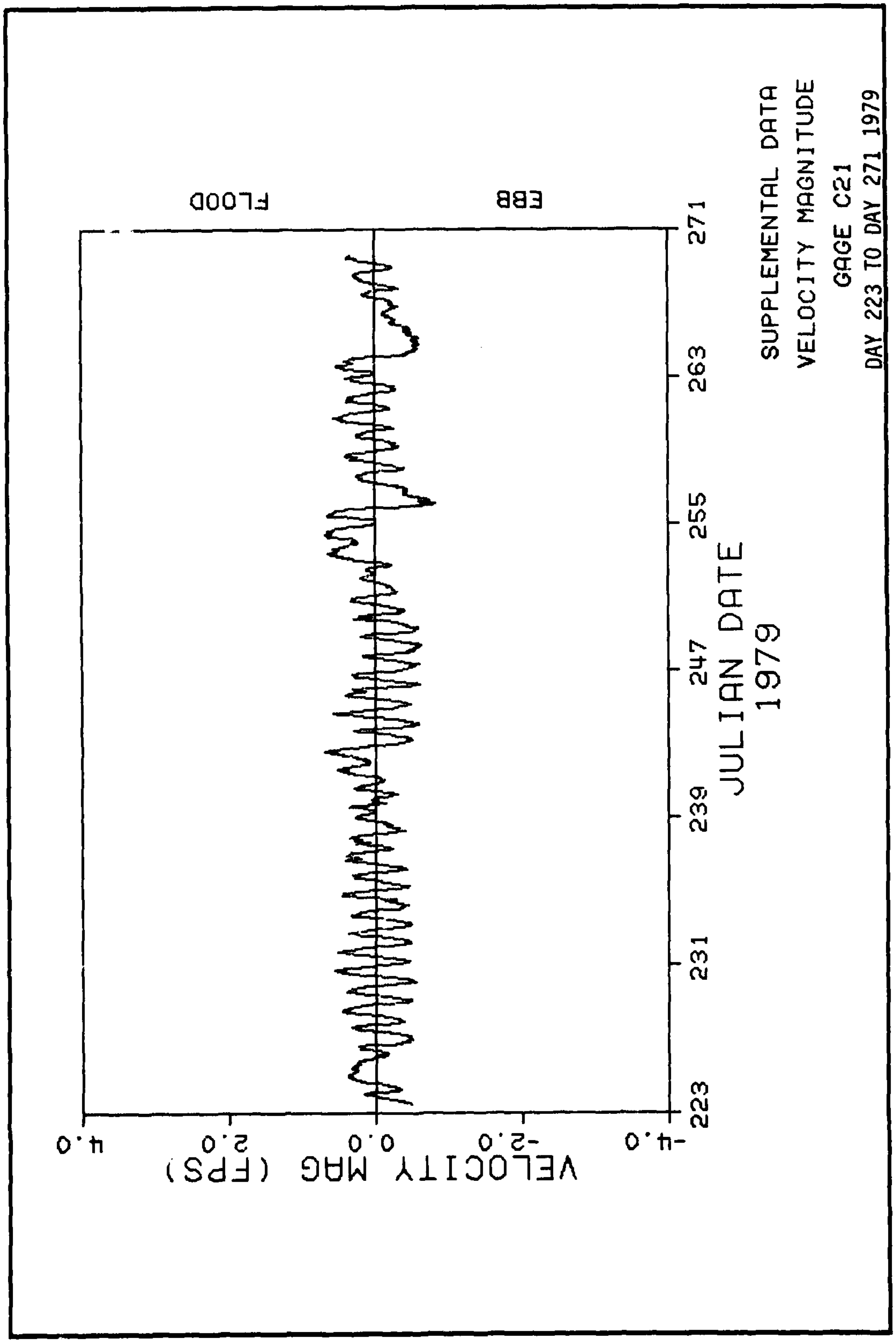
VELOCITY DATA SUMMARY
GAGE C21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GAGE C21
DAY 223 TO DAY 271 1979
FLOOD
EBB
VELOCITY MAG (FPS)
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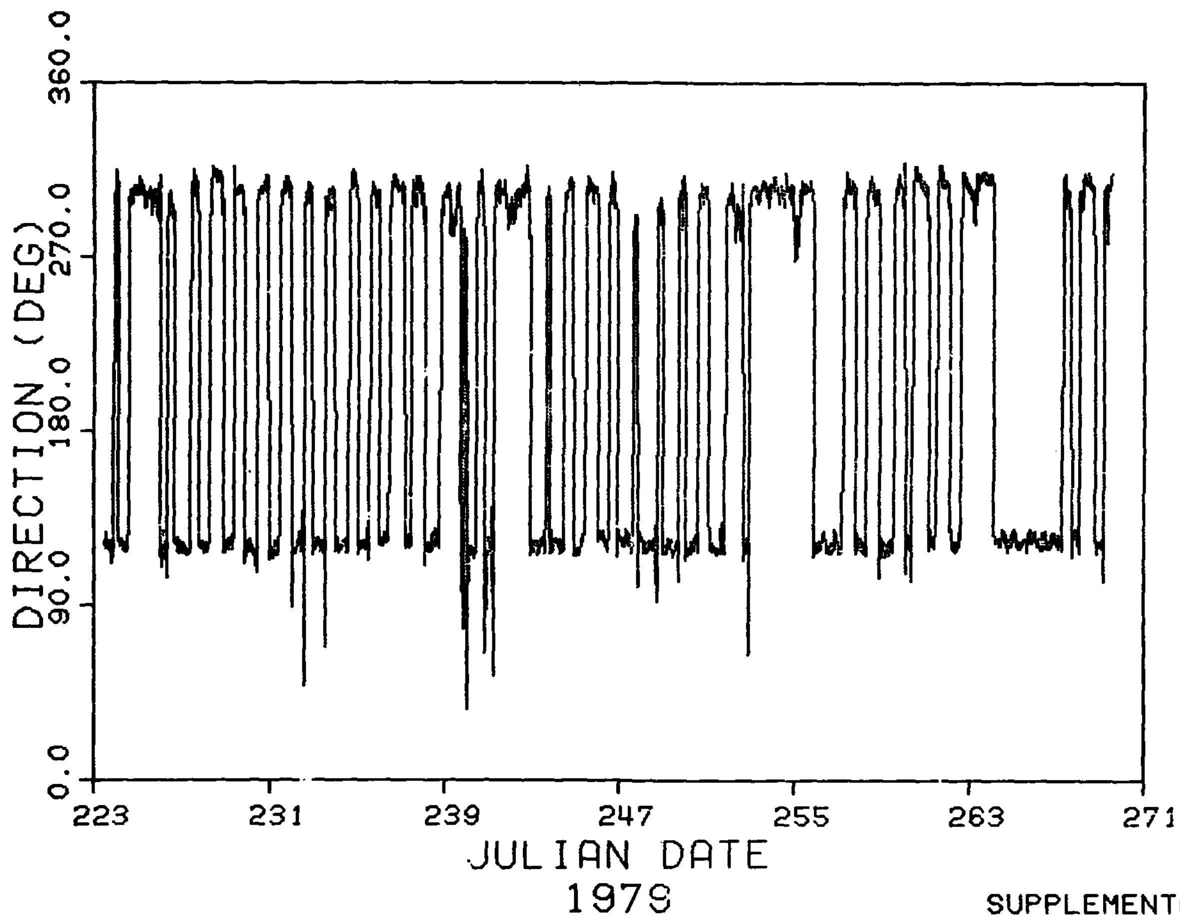
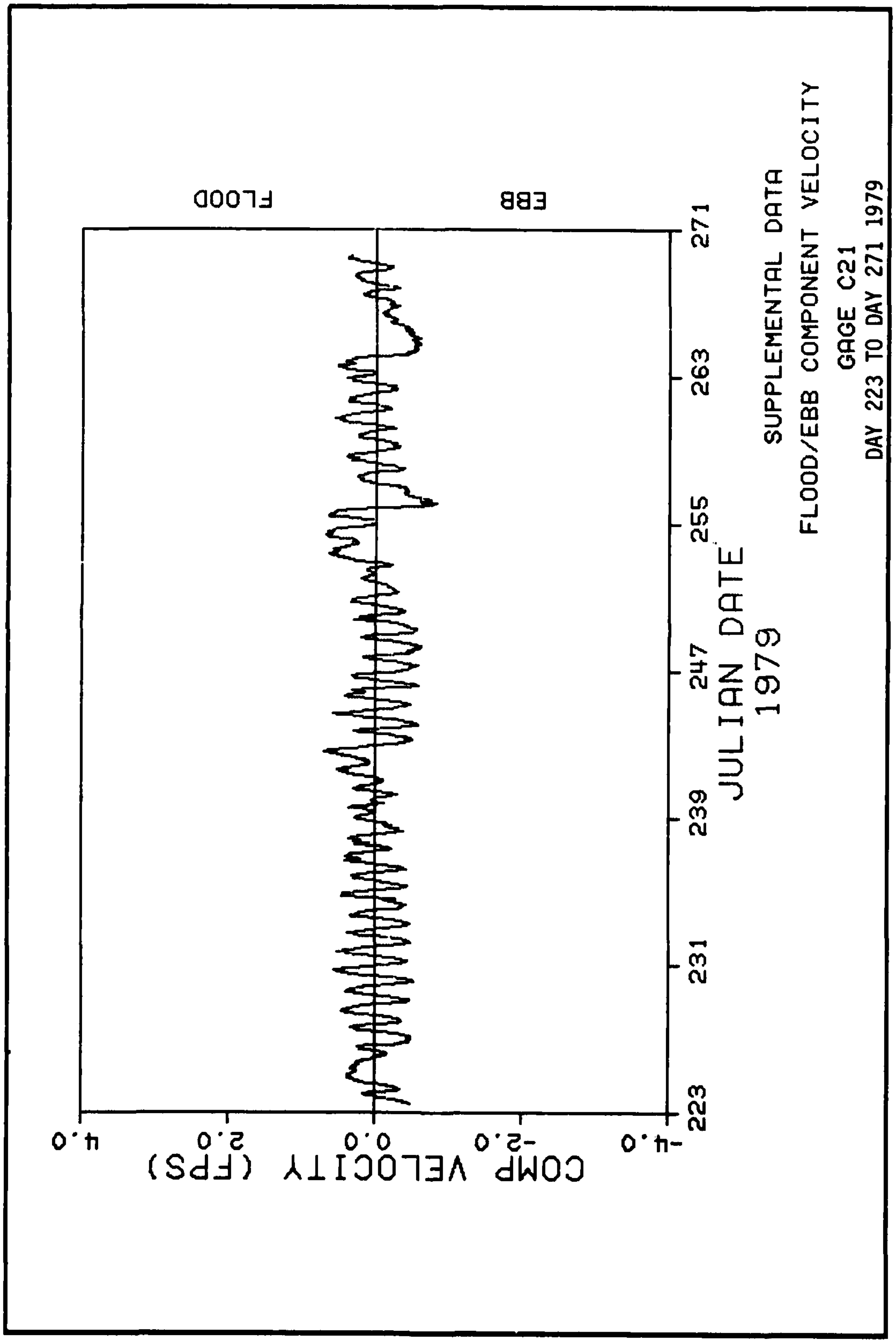
-2.0
-4.0
223
231
239
247
255
263
271
JULIAN DATE
1979

PLATE B38



SUPPLEMENTAL DATA
VELOCITY DIRECTION
GAGE C21
DAY 223 TO DAY 271 1979


SUPPLEMENTAL DATA
FLOOD/EBB COMPONENT VELOCITY
GAGE C21
DAY 223 TO DAY 271 1979
FLOOD
EBB
COMP VELOCITY (FPS)
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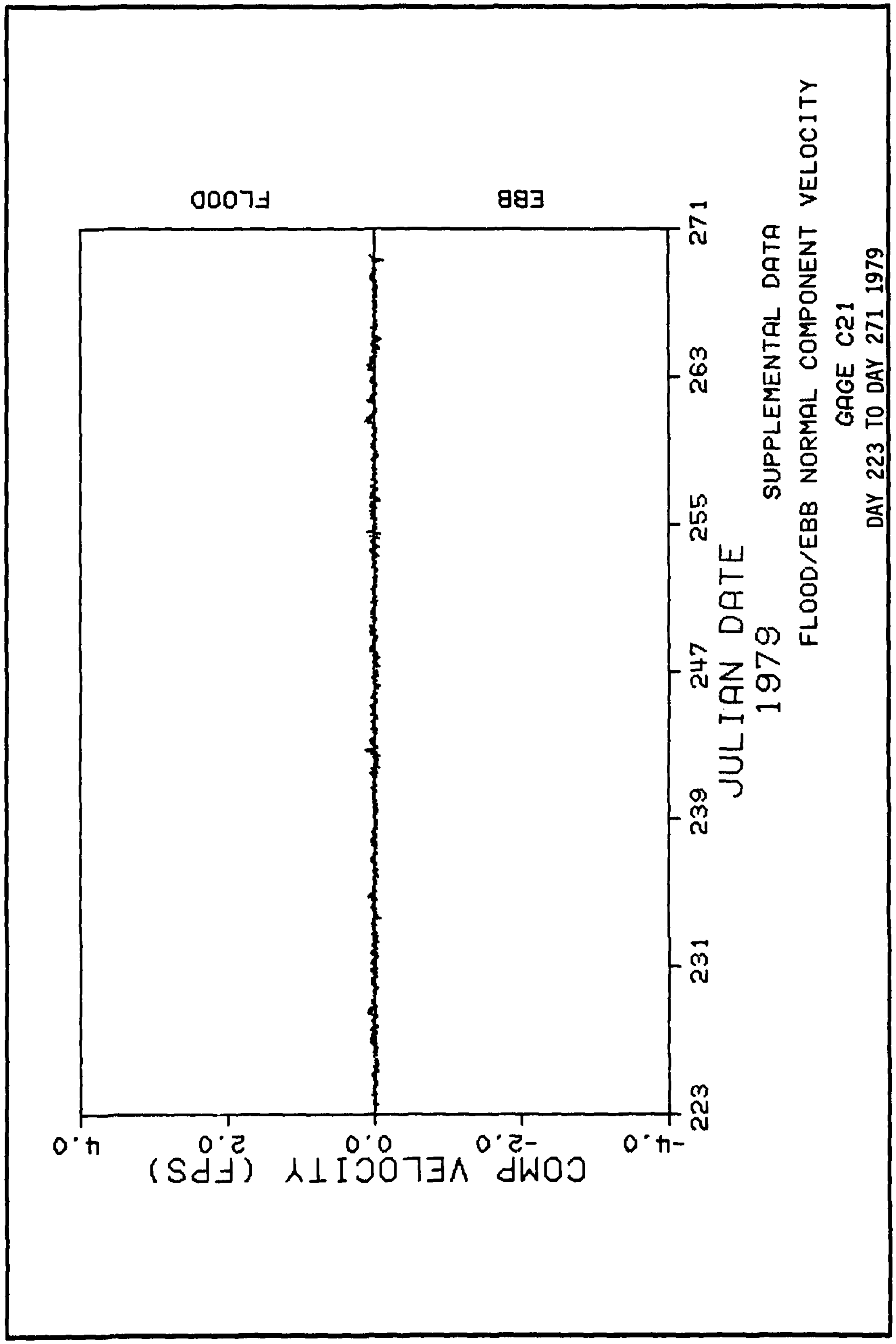
-4.0
JULIAN DATE
1979
223
231
239
247
255
263
271

PLATE B40


SUPPLEMENTAL DATA
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GAGE C21
DAY 223 TO DAY 271 1979
FLOOD
EBB
COMP VELOCITY (FPS)
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2.0
0.0
-2.0
-4.0
JULIAN DATE
1979
223
231
239
247
255
263
271

PLATE B41

APPENDIX C: BONNET CARRE OBSERVATIONS

Surface Elevations and Currents

1. The Bonnet Carre Flood Control Structure was opened from 19 April through 20 May 1979 to divert floodwater from the Mississippi River through Lake Pontchartrain to the Gulf of Mexico. Discharge observations in Lake Pontchartrain at a range 2 miles northeast of the floodway by LMN during the release period are given in Table C1. The initial discharge was $98(10^3)$ cfs on 19 April and reached a maximum of $249(10^3)$ cfs on 6 May.

2. Surface elevation data from tide gage sta B-2, B-4, and P-4 during the period 20 April 1979 through 19 May 1979 (Julian day 110 through 140) are shown in Plates C1-C3 with the average of the analyzed data record used as gage zero as discussed in paragraph 8 of the main report. In each case, the tide record indicates a rise in surface elevation of approximately 2.5 to 3.0 ft over the study area.

3. The data indicated that the rise in surface elevation in Lake Borgne preceded the rise in Lake Pontchartrain. At sta B-2, the maximum rise occurred approximately 9 hr in advance of the maximum rise at sta P-3. Current data from sta MM1, MM2, and MM3 for Julian days 107 through 121 (17 April to 1 May 1979) shown in Plates C4-C6, also indicated flow into Lake Pontchartrain on 21 and 22 April with flow out of Lake Pontchartrain from 23 to 28 April. After 28 April, the flow began to return to normal flood-ebb currents.

4. At sta MM-10A and MM-15 in Lake Pontchartrain, observed lake currents were near 0.1 fps from 19 April through 20 April but increased on 21 and 22 April to a maximum of 0.5 to 0.7 fps. Maximum current magnitudes then decreased to 0.3 to 0.5 fps by 1 May 1979. Current direction data did not properly record during most of the observation interval at MM-10A and MM-15 but, when available at MM-10A, indicated some variability with general direction of west to northwest. Winds recorded at weather station WS-2 on 21 and 22 April were from the east-southeast with hourly average wind speeds in excess of 15 mph and with

a maximum of 38 mph on the afternoon of 22 April, which would account for the seemingly unusual current direction at sta MM-10A.

5. The surface elevation data showed a gradual decreasing trend for approximately the next 40 days with a total decrease in surface elevation in Lake Pontchartrain at sta P-4 of approximately 3.8 ft.

Salinity

6. Salinity data obtained from stations in Lake Pontchartrain from 19 April through 9 August 1979 are tabulated in Table C2. Station locations are shown in Figure 9 in the main report. Data were collected at approximately one week to one month intervals but not all stations were included in each survey. Samples were normally taken at surface, middepth, and bottom. The salinity at most stations showed little variation from surface to bottom. However, the variation near Seabrook at sta S-9 on 10 July 1979 ranged from 0.9 ppt at the surface to 6.3 ppt and 6.1 ppt at middepth and bottom. The vertical salinity variation at S-9 was smaller on 10 July.

6. Middepth salinity data for each survey listed in Table C2 are shown in Plates C7-C12 plotted at each station location. Data obtained from 19-20 April, the first two days of release through the floodway, show a low salinity of 0.3 ppt at the east end of the Bonnet Carre Floodway and an increasing salinity moving eastward across Lake Pontchartrain. The 30 April-2 May survey indicated that salinity levels had dropped over the entire lake to the 0.3-0.7 ppt range with the exception of 1.8 ppt at sta S-8 near the north end of the Lake Pontchartrain causeway and 1.9 ppt at sta S-13 near the mouth of The Rigolets.

7. Limited data from the 10 July survey indicated salinity levels were generally increasing and had reached 6.3 ppt at middepth at sta S-9 near Seabrook and middepth salinities of 1.6, 1.5, and 0.7 ppt along the causeway at sta S-6, S-7, and S-8. Data from the 17-18 July survey showed little variation in salinity (1.3-1.6 ppt) west of the causeway across Lake Pontchartrain but indicated increasing salinity (1.8-3.2 ppt) moving across the eastern part of the lake. Again the salinity at sta

S-9 (4.0 ppt) near Seabrook was higher than adjacent stations. The 2 August survey indicated a general increase in salinity of approximately 0.1 to 0.2 ppt at most stations between 17-18 July and 2 August. Salinity near the mouths of tributaries along the northwest shoreline were low (0.3 ppt). A similar general increase occurred throughout the lake from 2-9 August.

8. Data from the salinity stations show the effect on salinity due to operation of the Bonnet Carre Control Structure. The salinity had dropped to a relatively low level (less than 1.0 ppt over most of the lake) by the end of April while the floodway was still in operation, but the salinity had returned to levels within the average minimum to average maximum range by the mid-July survey, about 2 months after the floodway was closed.

Table C1

Bonnet Carre Floodway Discharge Observation

Date 1979	Mean Discharge Thousands of cfs
April	
19	98
20	130
21	149
22	179
23	--
24	198
25	190
26	235
27	205
28	--
29	216
30	226
May	
1	244
2	238
3	224
4	243
5	247
6	249
7	218
8	216
9	204
10	177
11	166
12	161
13	141
14	123
15	108
16	97
17	83
18	58
19	55
20	42

Table C2

Salinity Observations in Lake Pontchartrain, 1979

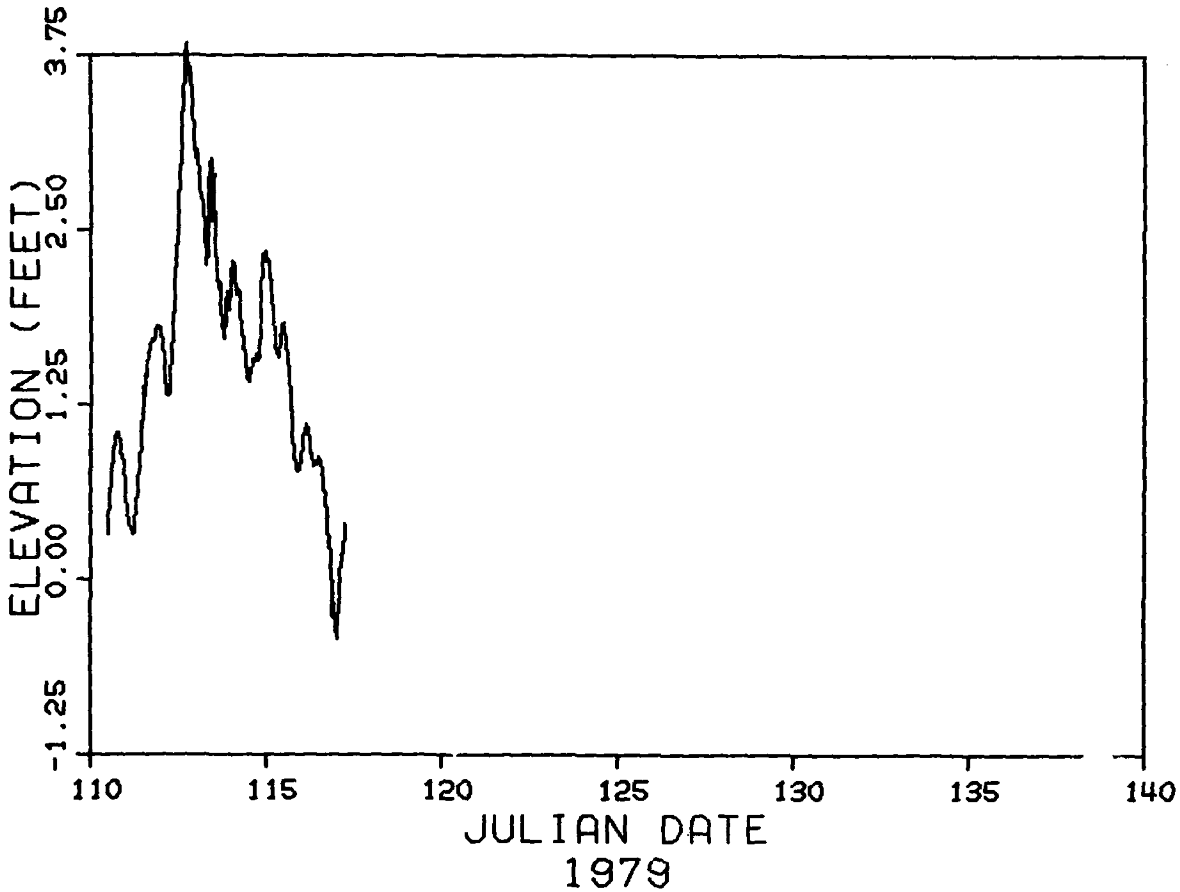
Station	Depth*	19-20 April	30 April 1 May	10 July	17-18 July	2 August	9 August
		Salinity, ppt					
S-1	S	1.6	0.7	--	1.4	--	--
	M	1.6	0.5	--	1.3	1.4	1.6
	B	1.7	0.3	--	1.3	--	--
S-2	S	1.8	0.7	--	0.5	--	--
	M	1.7	0.7	--	1.4	1.4	1.5
	B	1.7	0.7	--	1.4	--	--
S-3	S	0.3	0.3	--	1.4	--	--
	M	0.3	0.3	--	1.4	1.4	1.5
	B	0.4	0.3	--	1.4	--	--
S-4	S	1.6	0.3	--	1.4	--	--
	M	1.6	0.3	--	1.6	2.2	2.1
	B	1.7	0.3	--	1.7	--	--
S-5	S	2.0	0.3	--	1.4	--	--
	M	2.0	0.3	--	1.4	1.6	1.7
	B	2.0	0.3	--	1.4	--	--
S-6	S	2.1	0.3	1.6	2.4	--	--
	M	2.1	0.3	1.6	2.3	2.3	2.3
	B	2.1	0.3	1.6	2.5	--	--
S-7	S	1.9	0.3	1.6	1.7	--	--
	M	1.9	0.3	1.5	1.6	1.8	1.8
	B	1.9	0.3	1.6	1.5	--	--

(Continued)

* S, M, and B denote surface, middepth, and bottom stations, respectively.

Table C2 (Concluded)

Station	Depth	19-20 April	30 April 1 May	10 July	17-18 July	2 August	9 August
S-8	S	1.3	1.6	0.7	0.7	--	--
	M	1.3	1.6	0.7	0.9	1.1	1.3
	B	1.8	1.6	0.7	1.4	--	--
S-9	S	2.6	0.4	0.9	1.7	--	--
	M	2.7	0.3	6.3	4.0	2.3	3.0
	B	2.9	0.3	6.1	2.2	--	--
S-10	S	2.5	0.3	0.5	2.1	--	--
	M	2.4	0.3	0.5	1.8	2.3	2.3
	B	2.4	0.3	0.6	1.8	--	--
S-11	S	2.5	0.6	--	1.8	--	--
	M	2.5	0.6	--	1.9	2.0	2.1
	B	2.6	0.6	--	1.5	--	--
S-12	S	2.8	0.5	--	1.8	--	--
	M	2.8	0.5	--	1.8	2.3	4.0
	B	2.8	0.5	--	2.0	--	--
S-13	S	2.9	1.9	--	1.9	--	--
	M	2.9	1.9	--	3.2	2.9	3.8
	B	2.9	1.9	--	3.3	--	--
S-14	M	--	--	--	--	2.4	0.8
S-14A	M	--	--	--	--	--	5.4
S-15	M	--	--	--	--	3.2	--
S-16	M	--	--	--	--	0.3	1.0
S-17	M	--	--	--	--	0.2	0.2
S-18	M	--	--	--	--	0.3	1.1
S-19	M	--	--	--	--	0.3	--



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA
GAGE B-2
DAY 110 TO DAY 140 1979

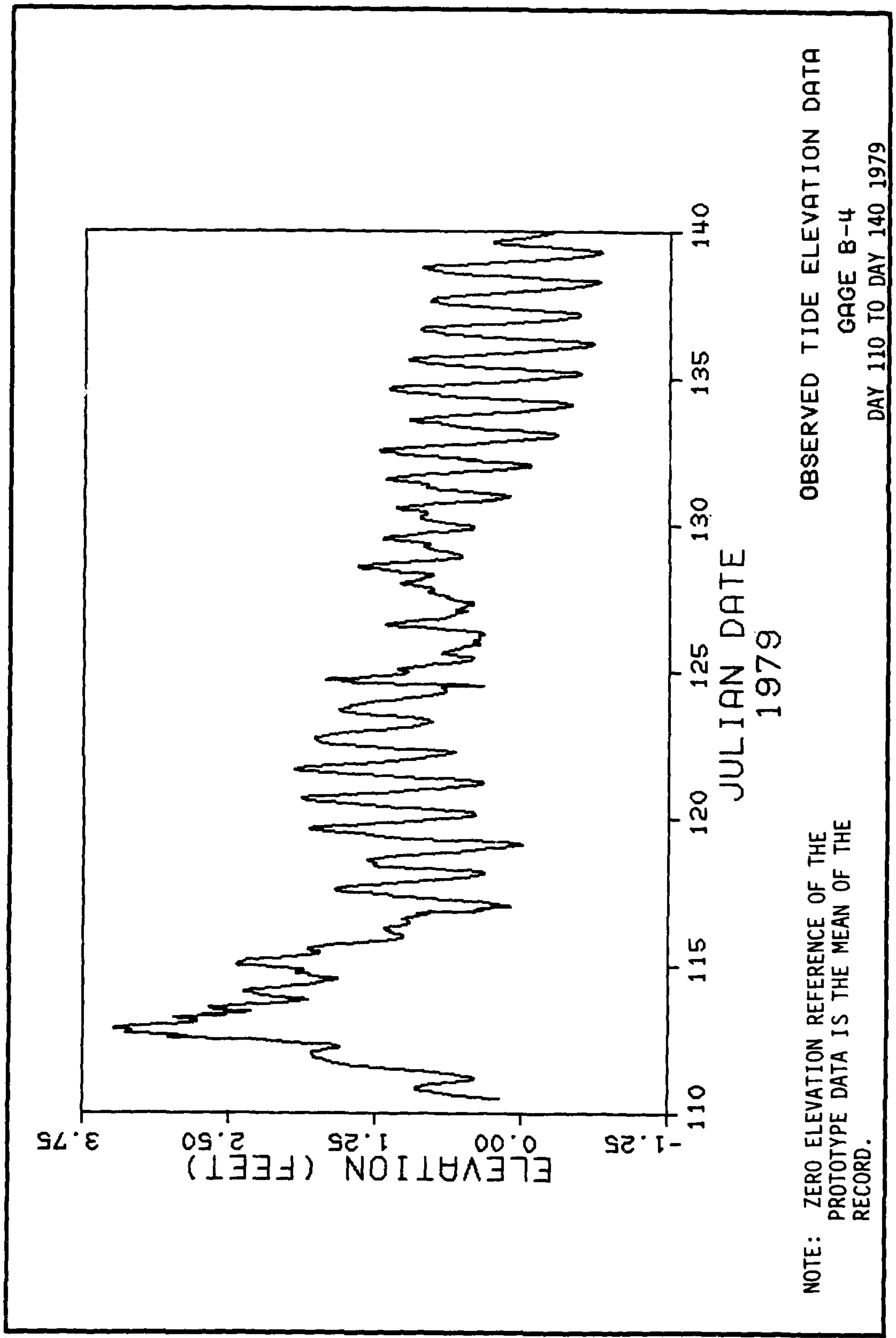
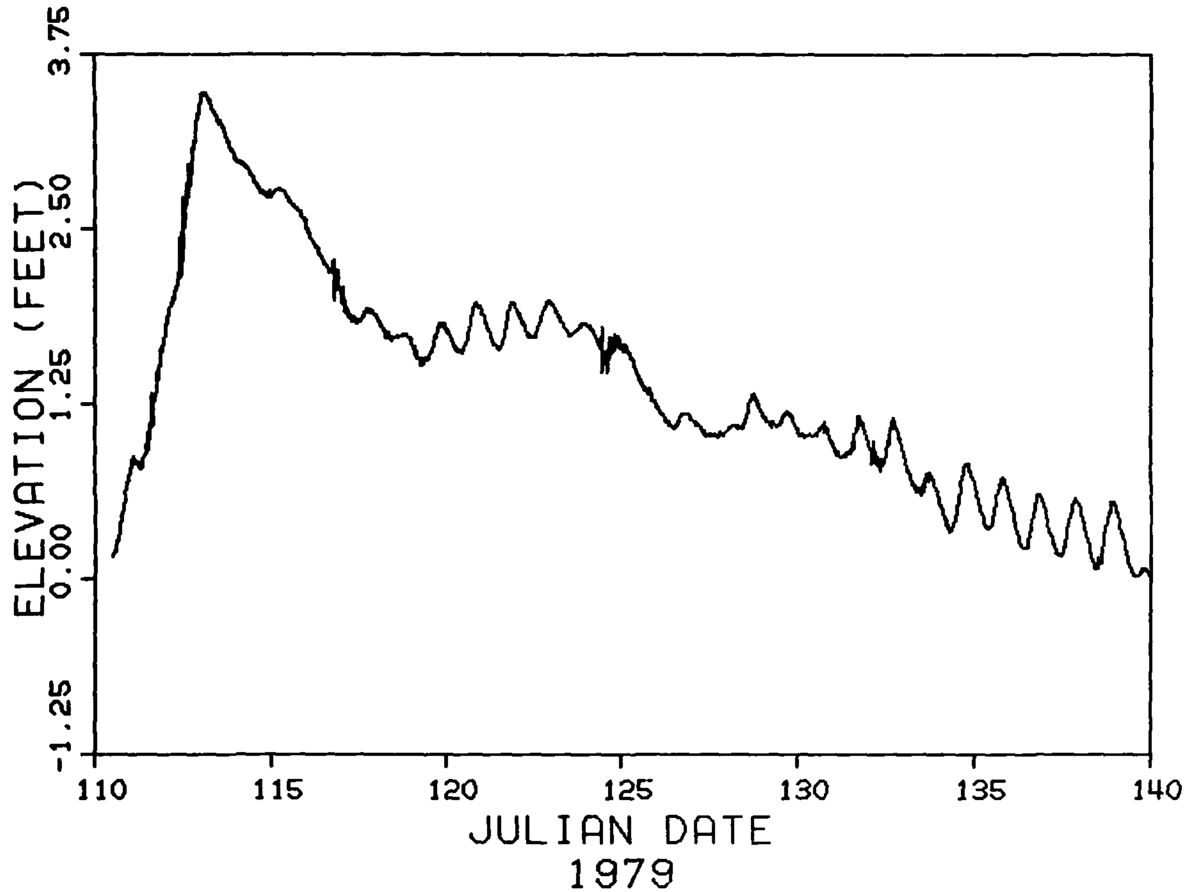

OBSERVED TIDE ELEVATION DATA
GAGE B-4
DAY 110 TO DAY 140 1979
ELEVATION (FEET)
3.75
2.50
1.25
0.00
-1.25
110
115
120
125
130
135
140
JULIAN DATE
1979
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

PLATE C2

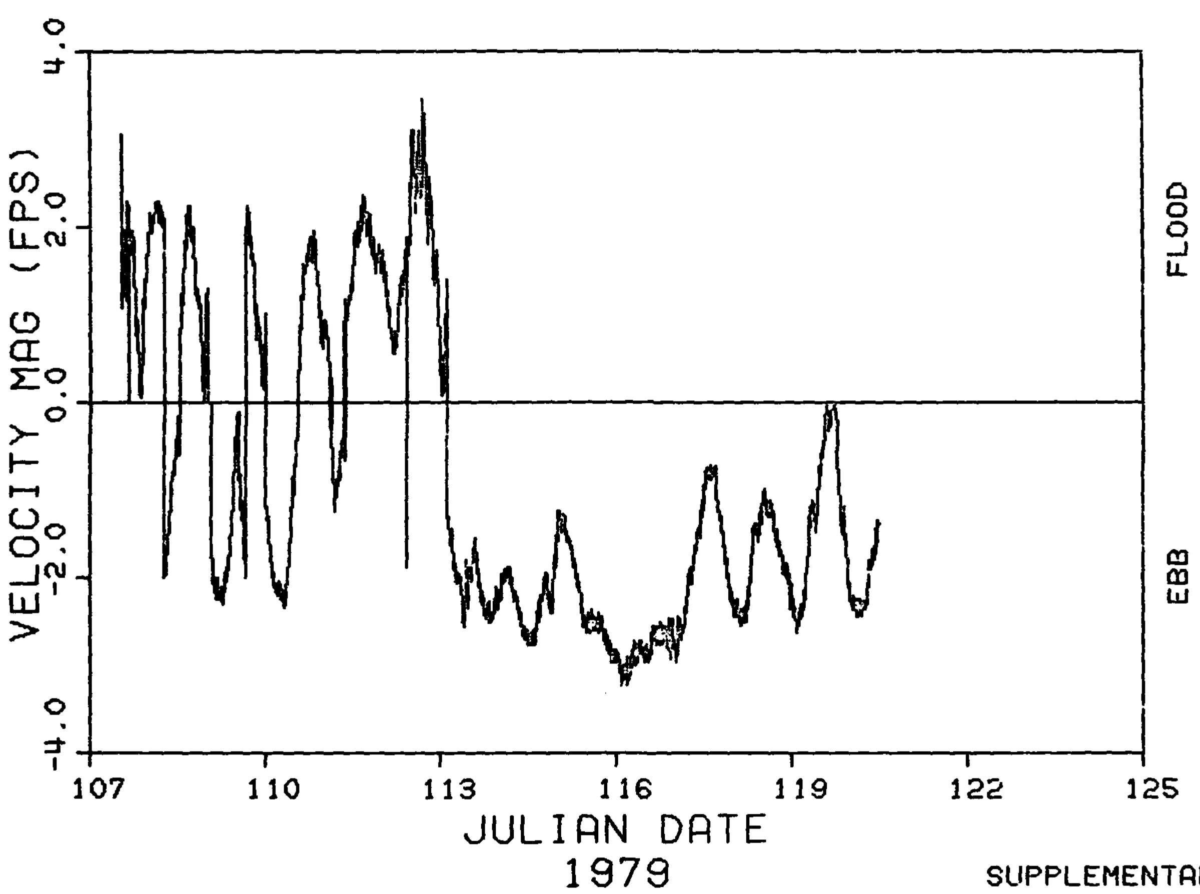


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE P-4

DAY 110 TO DAY 140 1979



SUPPLEMENTAL DATA
VELOCITY MAGNITUDE
GAGE MM1
DAY 107 TO DAY 125 1979

PLATE C4

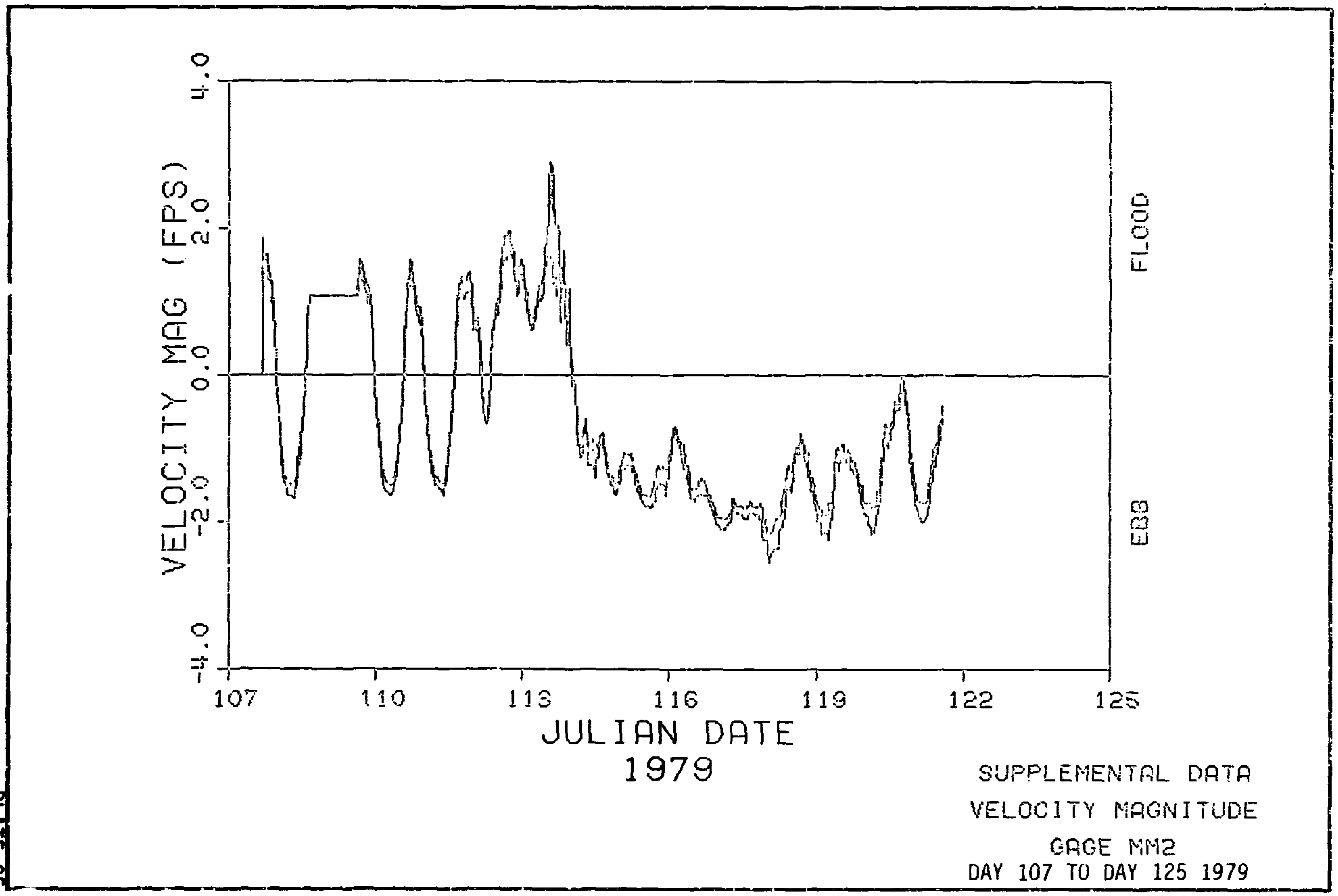

VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
FLOOD
EBB
107
110
113
116
119
122
125
JULIAN DATE
1979
SUPPLEMENTAL DATA
VELOCITY MAGNITUDE
GAGE MM2
DAY 107 TO DAY 125 1979

PLATE C5

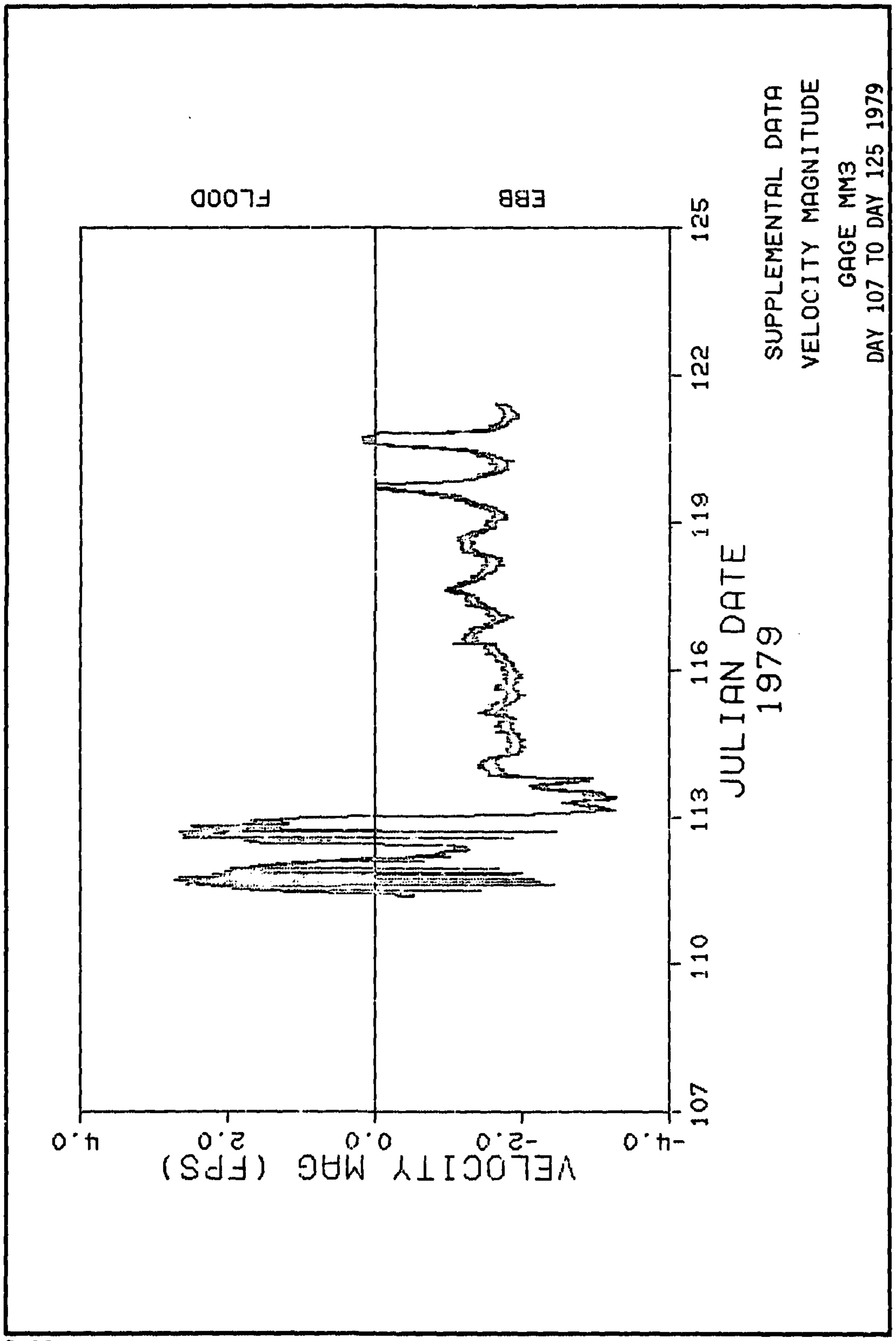
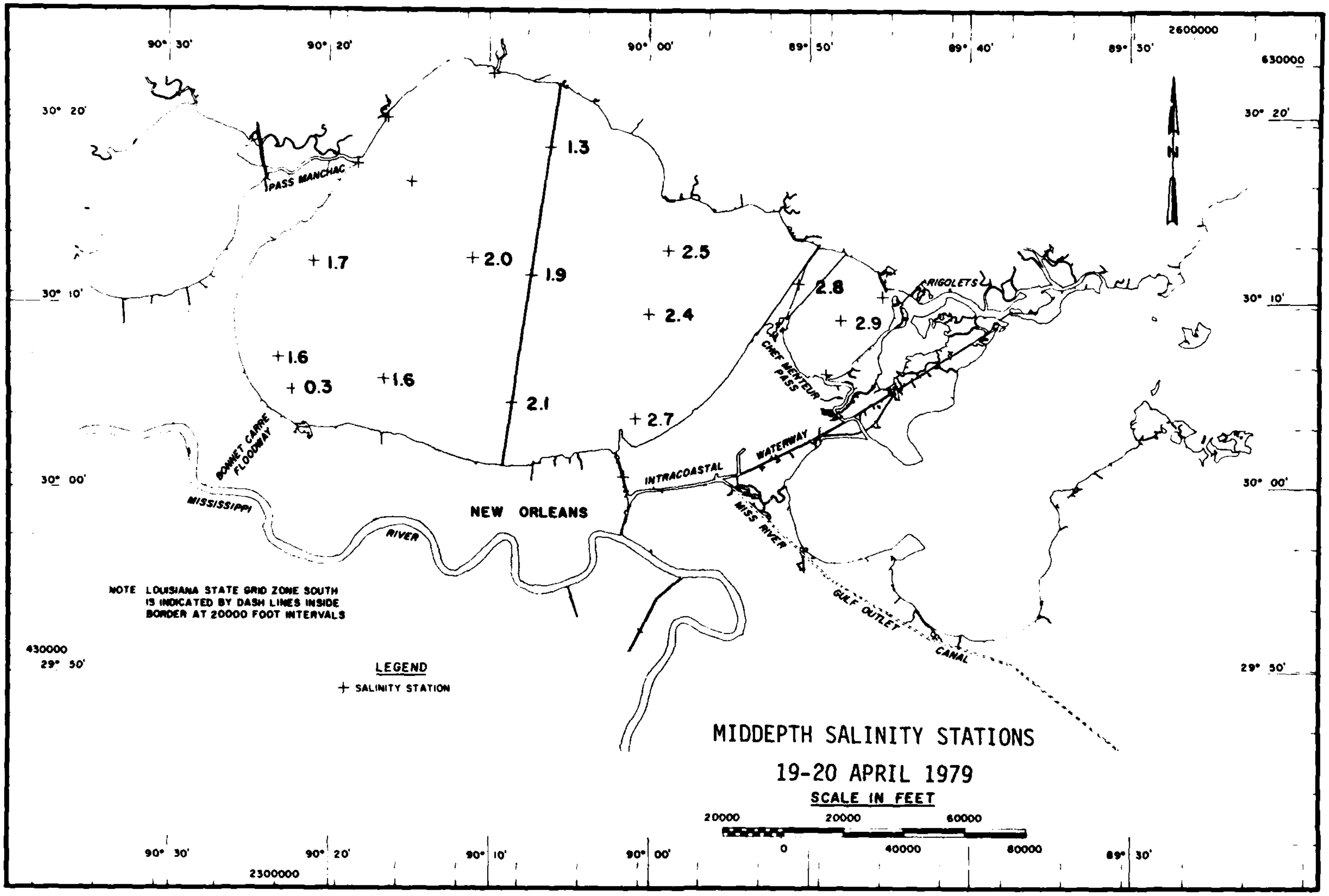
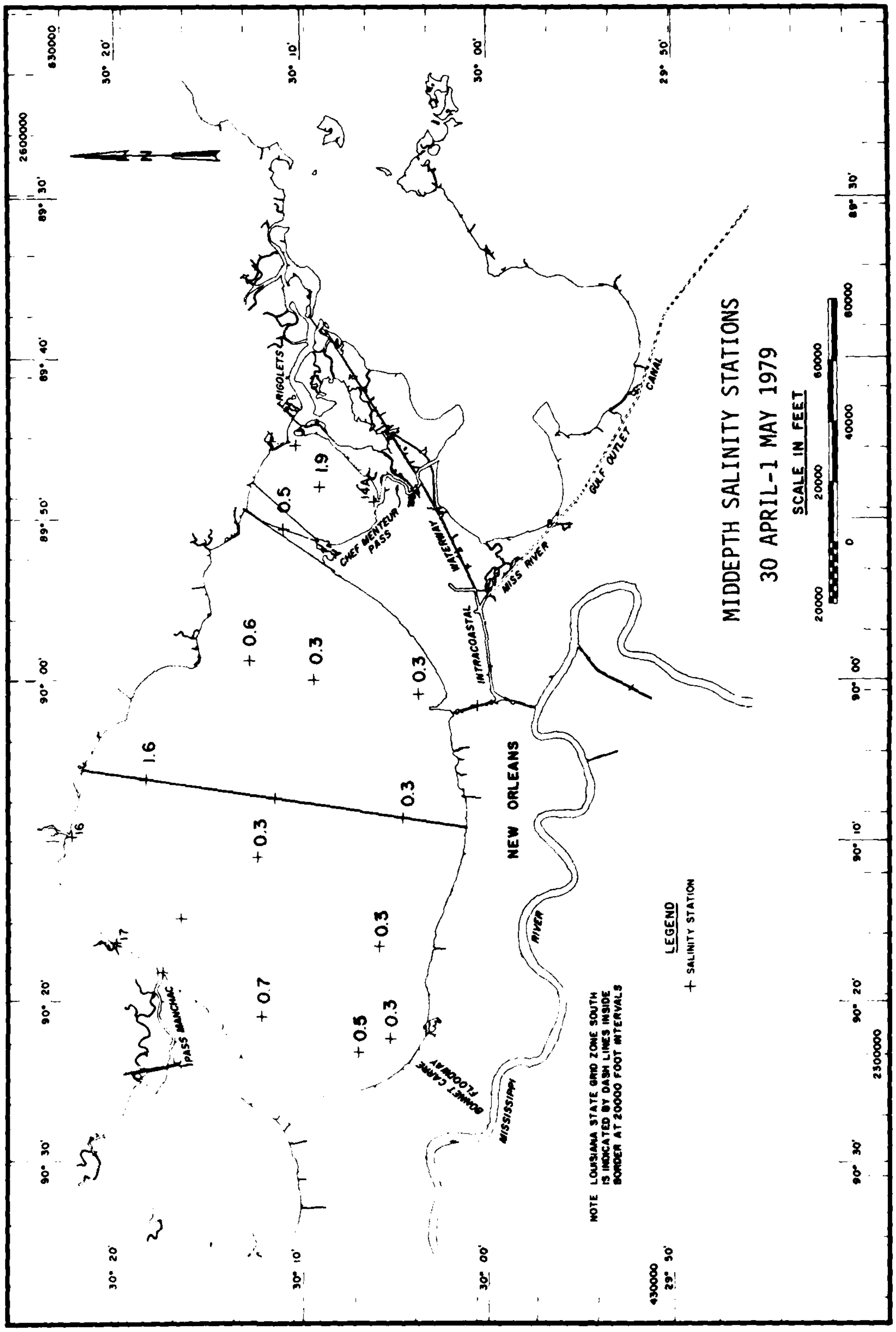

SUPPLEMENTAL DATA
VELOCITY MAGNITUDE
GAGE MM3
DAY 107 TO DAY 125 1979
FLOOD
EBB
VELOCITY MAG (FPS)
4.0
2.0
0.0
-2.0
-4.0
107
110
113
116
119
122
125
JULIAN DATE
1979

PLATE C6



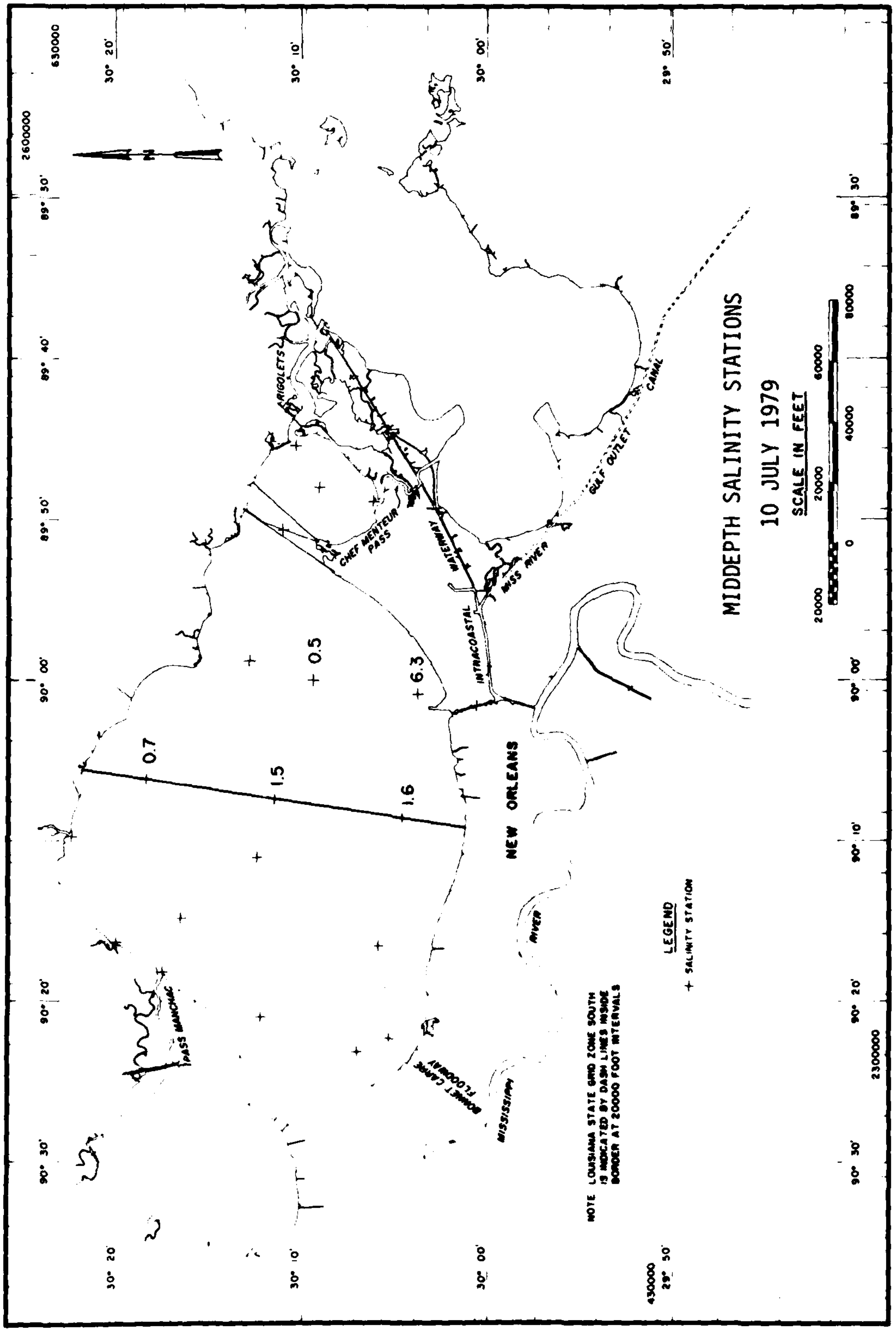
90° 30'
90° 20'
90° 10'
90° 00'
89° 50'
89° 40'
89° 30'
2600000
630000
30° 20'
30° 10'
30° 00'
29° 50'
430000
2300000
N
PASS MANCHAC
1.3
2.0
1.9
1.7
2.5
2.4
2.8
2.9
1.6
0.3
1.6
2.1
2.7
RIGOLETS
CHEF MENTEUR PASS
INTRACOASTAL
WATERWAY
BONNET CARRE FLOODWAY
MISSISSIPPI
RIVER
NEW ORLEANS
MISS RIVER
GULF OUTLET
CANAL
NOTE LOUISIANA STATE GRID ZONE SOUTH IS INDICATED BY DASH LINES INSIDE BORDER AT 20000 FOOT INTERVALS
LEGEND
+ SALINITY STATION
MIDDEPTH SALINITY STATIONS
19-20 APRIL 1979
SCALE IN FEET
20000
0
20000
40000
60000
80000

PLATE C7



MIDDEPTH SALINITY STATIONS
30 APRIL-1 MAY 1979
SCALE IN FEET
20000
0
20000
40000
60000
80000
LEGEND
+ SALINITY STATION
NOTE LOUISIANA STATE GRID ZONE SOUTH IS INDICATED BY DASH LINES INSIDE BORDER AT 20000 FOOT INTERVALS
NEW ORLEANS
MISSISSIPPI
RIVER
MISS RIVER
GULF OUTLET
CANAL
INTRACOASTAL
WATERWAY
CHEF MENTEUR PASS
RIGOLETS
PASS MANCHAC
BONNET CARRE FLOODWAY
+ 1.9
+ 0.5
+ 0.6
+ 0.3
+ 0.3
1.6
0.3
+ 0.3
+ 0.3
+ 0.7
+ 0.5
+ 0.3
14A
16
17
30° 20'
30° 10'
30° 00'
29° 50'
89° 30'
89° 40'
89° 50'
90° 00'
90° 10'
90° 20'
90° 30'
630000
2600000
2300000
430000

PLATE C8



MIDDEPTH SALINITY STATIONS
10 JULY 1979
SCALE IN FEET
20000
0
20000
40000
60000
80000
LEGEND
+ SALINITY STATION
NOTE LOUISIANA STATE GRID ZONE SOUTH IS INDICATED BY DASH LINES INSIDE BORDER AT 20000 FOOT INTERVALS
NEW ORLEANS
RIGOLETS
CHEF MENTEUR PASS
INTRACOASTAL WATERWAY
MISS RIVER
GULF OUTLET CANAL
PASS MANCHAC
BONNET CARRE FLOODWAY
MISSISSIPPI RIVER
0.7
1.5
1.6
0.5
6.3
30° 20'
30° 10'
30° 00'
29° 50'
90° 30'
90° 20'
90° 10'
90° 00'
89° 50'
89° 40'
89° 30'
630000
430000
2600000
2300000

PLATE C9

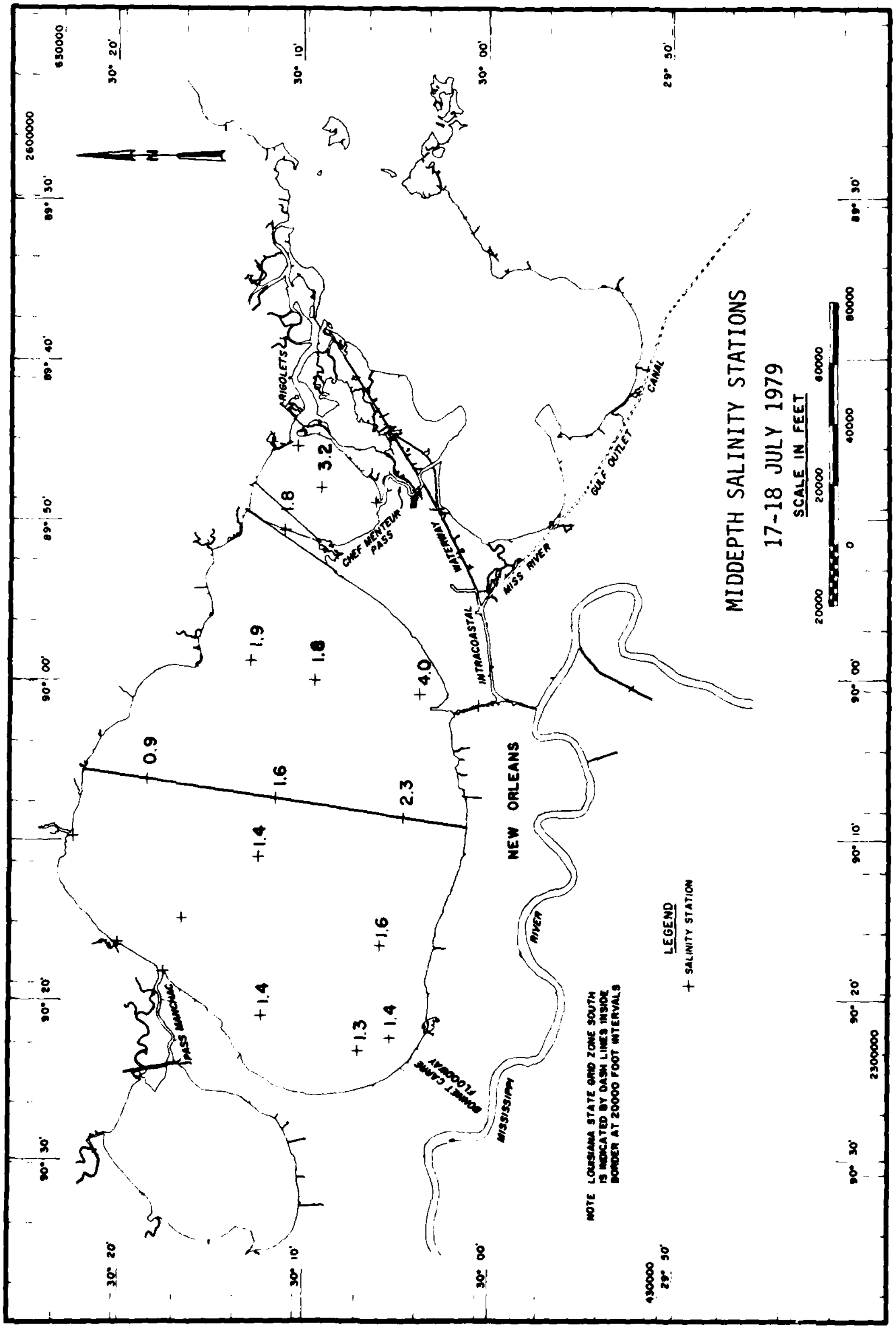
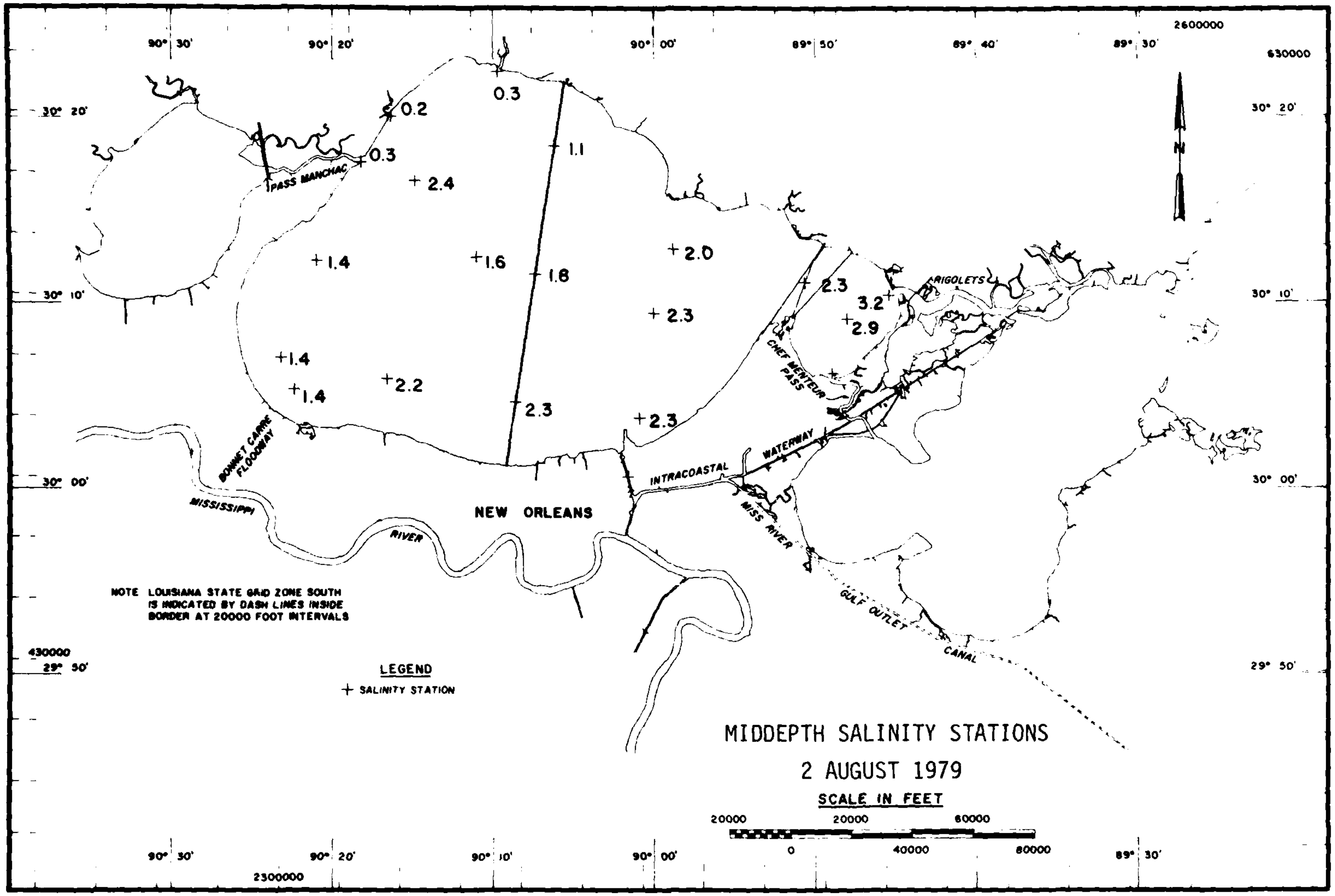

MIDDEPTH SALINITY STATIONS
17-18 JULY 1979
SCALE IN FEET
20000
0
20000
40000
60000
80000
LEGEND
+ SALINITY STATION
NOTE LOUISIANA STATE GRID ZONE SOUTH IS INDICATED BY DASH LINES INSIDE BORDER AT 20000 FOOT INTERVALS
NEW ORLEANS
RIGOLETS
CHEF MENTEUR PASS
INTRACOASTAL
WATERWAY
MISS RIVER
GULF OUTLET
CANAL
MISSISSIPPI
RIVER
BONNET CARRE FLOODWAY
PASS MANCHAC
N
3.2
1.8
1.9
1.8
4.0
0.9
1.6
2.3
1.4
1.6
1.4
1.3
1.4
30° 20'
30° 10'
30° 00'
29° 50'
89° 30'
89° 40'
89° 50'
90° 00'
90° 10'
90° 20'
90° 30'
630000
2600000
2300000
430000

PLATE C10



MIDDEPTH SALINITY STATIONS
2 AUGUST 1979
SCALE IN FEET
20000
0
20000
40000
60000
80000
LEGEND
+ SALINITY STATION
NOTE LOUISIANA STATE GRID ZONE SOUTH IS INDICATED BY DASH LINES INSIDE BORDER AT 20000 FOOT INTERVALS
NEW ORLEANS
PASS MANCHAC
BONNET CARRE FLOODWAY
MISSISSIPPI
RIVER
INTRACOASTAL
WATERWAY
CHEF MENTEUR PASS
RIGOLETS
MISS RIVER
GULF OUTLET
CANAL
N
0.3
0.2
0.3
2.4
1.1
1.4
1.6
1.8
2.0
2.3
3.2
2.9
2.3
1.4
1.4
2.2
2.3
2.3
90° 30'
90° 20'
90° 10'
90° 00'
89° 50'
89° 40'
89° 30'
30° 20'
30° 10'
30° 00'
29° 50'
2600000
630000
430000
2300000

PLATE C11

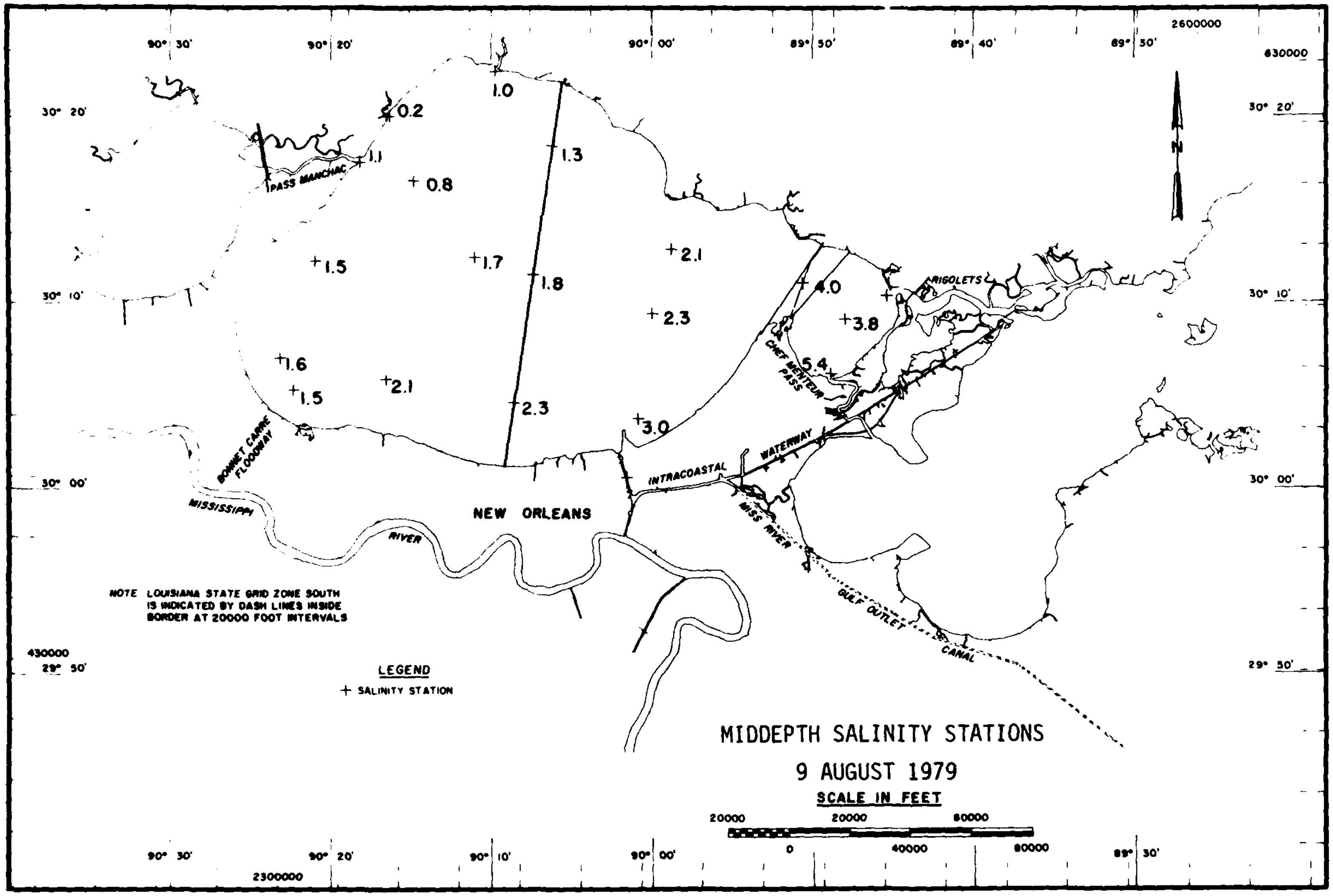

MIDDEPTH SALINITY STATIONS
9 AUGUST 1979
SCALE IN FEET
20000
0
20000
40000
60000
80000
LEGEND
+ SALINITY STATION
NOTE LOUISIANA STATE GRID ZONE SOUTH IS INDICATED BY DASH LINES INSIDE BORDER AT 20000 FOOT INTERVALS
NEW ORLEANS
PASS MANCHAC
BONNET CARRE FLOODWAY
MISSISSIPPI
RIVER
INTRACOASTAL
WATERWAY
MISS RIVER
GULF OUTLET
CANAL
CHEF MENTEUR PASS
RIGOLETS
N
90° 30'
90° 20'
90° 10'
90° 00'
89° 50'
89° 40'
89° 30'
30° 20'
30° 10'
30° 00'
29° 50'
2600000
630000
430000
2300000
1.0
0.2
1.1
0.8
1.3
1.5
1.7
1.8
2.1
2.3
4.0
3.8
5.4
1.6
1.5
2.1
2.3
3.0

PLATE C12

APPENDIX D: EFFECTS OF HURRICANES BOB AND FREDERIC

Observations During Hurricane Bob

1. Hourly average observed wind data at 10 m height during Hurricane Bob at weather station WS-2 mounted on the Highway 11 Bridge at the east end of Lake Pontchartrain are given in Table D1 for 10 and 11 July 1979 (Julian days 191 and 192). The wind data show that the winds at station WS-2 increased on the afternoon of 10 July and continued to increase on the morning of 11 July to a maximum hourly average speed of 45 mph from 0900 to 1000 CST. Hourly average winds decreased to less than 10 mph after 1900 CST on 11 July. The wind direction as hourly average winds increased above 10 mph ranged from south-southeast to east-northeast until maximum wind speeds developed and the direction shifted to southwest. Winds then remained from the southwest until hourly average winds decreased below 10 mph. Wind data from station WS-1 was not available during this period.

2. Observed tidal elevation data from 7 July through 22 July (Julian days 188 through 203) for sta B-2 and B-6 in Lake Borgne and P-3 in Lake Pontchartrain on the causeway (see Figure 2 in main test for locations) are shown in Plates D1, D2, and D3 using the zero gage reference as discussed in paragraph 8 of the main report. In Lake Borgne, the water level was relatively constant preceding and after passage of the hurricane. However, the water level at sta B-2 in the mouth of the Pearl River increased approximately 2.5 ft near 1100 CST on 11 July. At sta B-6 near Shell Beach along the southeastern shore of Lake Borgne, little increase in the water level occurred. Hurricane winds apparently did result in a slightly earlier rise in the Lake Borgne surface elevation than would normally have occurred under tidal conditions. A decrease in water level at sta B-6 over several hours of approximately 0.5 ft did occur coincident with the maximum rise in water level at Pearl River.

3. Near the north end of the Lake Pontchartrain Causeway at sta P-3, a rise in lake level of approximately 2 ft occurred over several

hours with a more gradual decrease in water level as the tidal fluctuation again became predominant. Data from sta P-9 in the west end of the lake at Pass Manchac, given in Table D2 for 11 July 1979, indicate that the rise in lake level occurred over the entire lake. Data from sta P-3 are included in the table. The peak water level at sta P-9 occurred near 1000 on 11 July, approximately the same time as at sta P-3. The rise in elevation at P-6 was 0.70 ft higher than at sta P-3 but may be affected by the record length used in determining the zero gage reference (discussed in paragraph 8 of the main report).

4. Most current meters were retrieved before the arrival of Hurricane Bob over the study area. However, current data were available from sta MM2 in Lake Pontchartrain at Chef Menteur and from sta MM17 in the southwest part of the lake (see Figure 8 in main text for locations). The sta MM2 data are given in Table D3 for 11 July. Current data from sta MM2 indicate ebb currents during the first half hour on 11 July. Over the next 4 hr, currents shifted to flood into the lake and continued to flood into the lake until 0400 CST. From 0400 to 1200 CST, currents ebbed from the lake with a maximum velocity of 4.55 fps at approximately 1000 CST. After 1200 CST the currents returned to flood through the remainder of the day. Current data from sta MM17 on 11 July, given in Table D3, show that the maximum velocity was 1.6 fps at approximately 1115 CST with currents in excess of 1 fps over approximately 1-1/2 hr. During the period with velocities over 1 fps, the current direction was to the south-southeast.

Observations During Hurricane Frederic

5. Hourly average observed wind data at 10 m during Hurricane Frederic at weather station WS-2 located at the east end of Lake Pontchartrain are given in Table D4 for 11, 12, and 13 September 1979 (Julian days 254, 255, and 256). Wind data show that hourly average winds were reasonably strong, generally in excess of 10 mph, on 11 July and increased on 12 July to a maximum of 39 mph between hours 2000 and 2100 and hours 2300 and 2400. Winds then decreased to less than 15 mph after hour 1000 on 13 July. Wind direction on 11 July shifted gradually

from east-northeast to north-northeast. Winds continued from north-northeast on 12 July until near hour 1500 when the wind shifted north-northwest. After hour 2200 on 12 July, winds began to shift to the west and had an average direction of west-southwest after hour 0300 on 13 July until winds decreased below 20 mph at hour 0800.

6. The effect of Hurricane Frederic on water levels was of a longer duration than the effect due to Hurricane Bob. Surface elevation data for sta B-2 and B-6 in Lake Borgne and P-3 in Lake Pontchartrain are shown in Plates D4, D5, and D6. In Lake Borgne, the data show a rise in surface elevation of approximately 2 ft over several days starting near day 251. The surface elevation was at a maximum on 12 September (day 255) near hour 0900. At sta B-2, the surface elevation then dropped approximately 3.6 ft over the next 18 hr as the hurricane moved inland near Mobile and the wind direction changed from north-northeast to west and hourly average winds increased to maximum velocity.

7. In Lake Pontchartrain at sta P-3, a similar gradual rise and decrease of approximately 1.5 ft in lake level occurred. The decrease occurred over approximately 18 hr in Lake Borgne but extended over approximately 33 hr in Lake Pontchartrain.

8. The maximum elevation in Lake Pontchartrain on 12 September was not sharply peaked and was near the same elevation at each gage over a period of approximately 6 hr. Data from sta P-1 and P-9, given in Table D5, did not indicate differences in maximum surface elevation greater than 0.8 ft using the zero gage reference. Data for sta P-3 also are included in Table D5.

9. Observed current data during Hurricane Frederic are shown in Appendix B in Plates B2-B41. In The Rigolets, current data from sta C15 show predominantly flood flow into Lake Pontchartrain for approximately 3 days ending on 12 September as water levels in the study area rose. A strong ebb flow then developed for 1-1/2 days as the lake level receded with maximum ebb velocity of 3.2 fps. Currents in Chef Menteur at sta C8 were quite similar in trend but with a maximum ebb velocity of 3.0 fps. In Pass Manchac at sta C21, flood flow into Lake Maurepas was continuous (maximum 0.7 fps) for approximately

3 days prior to development of ebb flow near hour 2100 on 12 September 1979 (day 255).

10. The effect of shift in wind direction in the connecting channels is shown at sta C5 in the Intracoastal Waterway where a low magnitude flood current (0.3 fps) developed for approximately 6 hr starting near hour 2300 on 12 September (day 255). This was preceded by 3 days of continuous ebb (maximum 1.8 fps). As the strong ebb current developed in The Rigolets and Chef Menteur, strong ebb flow in the Intracoastal Waterway again developed and continued for 2 days (maximum 1.7 fps).

Table D1

Hourly Average Winds During Hurricane Bob

10 July 1979			11 July 1979		
Hour CST	Wind Speed mph	Average Direction	Hour CST	Wind Speed mph	Average Direction
0100	5	SSW	0100	20	ENE
0200	5	SSW	0200	20	ENE
0300	4	SSW	0300	21	ENE
0400	3	SW	0400	28	ENE
0500	6	W	0500	32	ENE
0600	8	NNE	0600	34	E
0700	10	NE	0700	39	ESE
0800	11	ENE	0800	39	ESE
0900	12	SE	0900	43	SE
1000	8	SE	1000	45	SSE
1100	10	ESE	1100	30	SSW
1200	15	SE	1200	26	SSW
1300	15	ESE	1300	29	SW
1400	17	ESE	1400	30	SW
1500	17	ESE	1500	28	SW
1600	17	E	1600	25	SW
1700	18	ESE	1700	22	SW
1800	20	ESE	1800	17	SW
1900	19	SE	1900	14	SW
2000	17	ESE	2000	8	SSW
2100	17	ESE	2100	6	SSW
2200	19	ESE	2200	6	SSW
2300	15	E	2300	6	SSW
2400	15	ENE	2400	7	SSW

Table D2

Surface Elevation Data Observed at Sta P-3 and P-9 During Hurricane Bob on 11 July 1979

Hour CST	Surface Elevation, ft P-3	P-9
0100	-0.09	0.78
0200	-0.08	0.95
0300	-0.27	0.79
0400	-0.37	0.77
0500	-0.31	0.73
0600	-0.34	0.58
0700	0.20	1.17
0800	0.77	1.91
0900	0.45	2.50
1000	2.11	2.81
1100	2.10	1.46
1200	0.82	0.97
1300	1.15	0.99
1400	1.12	1.28
1500	0.62	1.21
1600	1.15	1.45
1700	0.80	1.32
1800	0.68	1.23
1900	0.90	1.56
2000	0.65	1.25
2100	0.61	1.23
2200	0.64	1.34
2300	0.54	1.06
2400	0.41	1.19

Table D3

Current Data Observed at Sta MM2 During Hurricane Bob on 11 July 1979

Hour CST	Average Velocity fps MM2	Average Velocity fps MM17	Direction deg Magnetic MM2	Direction deg Magnetic MM17	Hour CST	Average Velocity fps MM2	Average Velocity fps MM17	Direction deg Magnetic MM2	Direction deg Magnetic MM17
0000	0.42	0.19	91	313	1230	0.36	0.56	210	161
0030	0.52	0.26	181	282	1300	0.89	0.49	216	164
0100	0.52	0.13	181	33	1330	1.22	0.23	210	119
0130	0.59	0.26	194	292	1400	1.08	0.42	209	112
0200	0.32	0.42	188	298	1430	0.79	0.42	202	127
0230	0.42	0.52	196	320	1500	0.59	0.26	206	170
0300	0.29	0.56	209	309	1530	0.39	0.16	205	177
0330	0.23	0.49	220	317	1600	0.29	0.26	198	170
0400	0.13	0.62	257	329	1630	0.36	0.46	198	120
0430	0.56	0.56	351	302	1700	0.62	0.39	201	94
0500	0.95	0.52	352	333	1730	0.49	0.23	198	142
0530	1.45	0.59	8	313	1800	0.69	0.16	201	157
0600	1.58	0.29	351	292	1830	0.95	0.13	198	142
0630	2.14	0.39	352	60	1900	1.11	0.13	194	116
0700	2.44	0.39	2	29	1930	0.98	0.16	195	133
0730	2.73	0.46	4	25	2000	0.69	0.32	199	120
0800	3.39	0.32	333	343	2030	0.72	0.26	196	133
0830	3.99	0.23	345	64	2100	0.69	0.19	189	144
0900	3.99	0.26	345	98	2130	0.89	0.13	189	165
0930	4.05	0.36	4	303	2200	1.05	0.13	192	143
1000	4.55	0.79	8	119	2230	1.15	0.19	192	119
1030	--	1.31	--	119	2300	1.18	0.16	189	119
1100	--	1.31	--	111	2330	1.28	0.09	198	132
1130	2.67	0.85	330	122	2400	1.38	0.00	194	167
1200	0.39	0.65	333	175					

Table D4

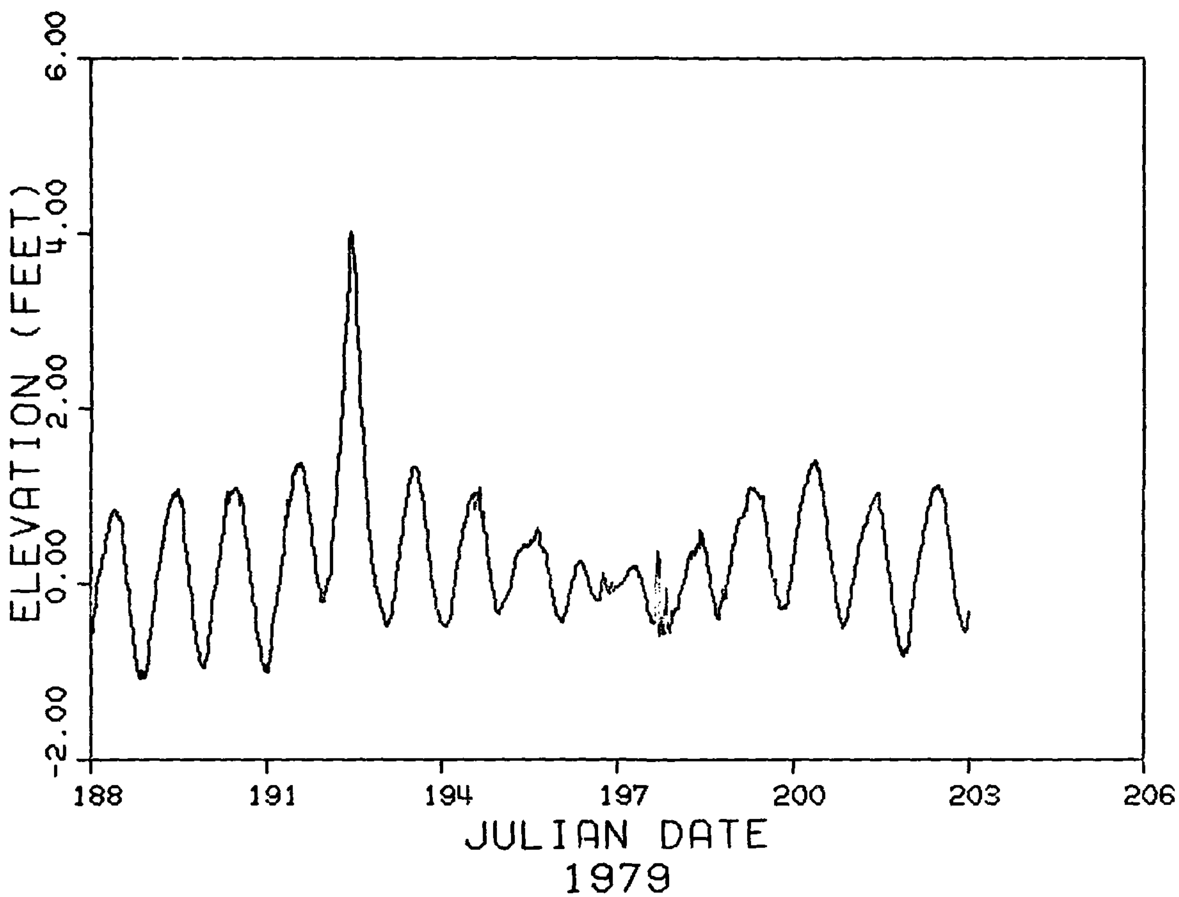
Hourly Average Winds During Hurricane Frederic

Hour CST	Wind Speed mph	Average Direction
	11 Sep 79	
0100	19	ENE
0200	20	ENE
0300	21	ENE
0400	22	ENE
0500	21	ENE
0600	20	ENE
0700	21	ENE
0800	20	ENE
0900	18	ENE
1000	17	ENE
1100	15	ENE
1200	13	ENE
1300	12	E
1400	9	ESE
1500	6	ESE
1600	12	NE
1700	9	NNE
1800	8	NNE
1900	8	NNE
2000	11	NNE
2100	13	NNE
2200	17	NNE
2300	20	NNE
2400	23	NNE
	12 Sep 79	
0100	20	NNE
0200	19	NNE
0300	17	NNE
0400	17	NNE
0500	16	NNE
0600	13	NNE
0700	12	NNE
0800	16	NNE
0900	18	NNE
1000	19	NNE
1100	17	NNE
1200	15	NNE
	12 Sep 79 (Continued)	
1300	16	NNE
1400	18	NNE
1500	22	N
1600	25	NNW
1700	28	NNW
1800	30	NNW
1900	32	NNW
2000	35	NNW
2100	39	NNW
2200	35	NNW
2300	33	WNW
2400	39	W
	13 Sep 79	
0100	38	W
0200	32	W
0300	28	W
0400	27	WSW
0500	25	WSW
0600	23	WSW
0700	22	WSW
0800	20	WSW
0900	19	W
1000	17	W
1100	13	W
1200	11	WSW
1300	10	WSW
1400	7	WSW
1500	8	SSW
1600	7	SSW
1700	6	SSW
1800	8	W
1900	14	NNW
2000	11	NNW
2100	13	N
2200	15	N
2300	14	NNE
2400	13	NNE

Table D5

Surface Elevation Data Observed at Sta P-1, P-3, and P-9 During Hurricane Frederic on 12 September 1979

Hour	Surface Elevation, ft		
CST	P-1	P-3	P-9
0100	1.31	0.76	1.57
0200	1.32	0.85	1.60
0300	1.40	0.84	1.52
0400	1.54	0.94	1.65
0500	1.58	0.99	1.69
0600	1.62	0.96	1.67
0700	1.79	1.07	1.77
0800	1.82	1.15	1.83
0900	1.86	1.19	1.91
1000	1.92	1.32	2.01
1100	1.95	1.32	2.02
1200	2.07	1.32	2.01
1300	2.10	1.41	2.07
1400	2.14	1.37	2.07
1500	2.15	1.34	2.02
1600	1.40	1.38	2.10
1700	1.32	1.28	1.99
1800	2.32	1.26	1.85
1900	2.31	1.18	1.80
2000	2.17	1.03	1.69
2100	2.22	1.04	1.55
2200	2.19	0.85	1.46
2300	2.14	0.97	1.24
2400	2.18	0.95	1.18

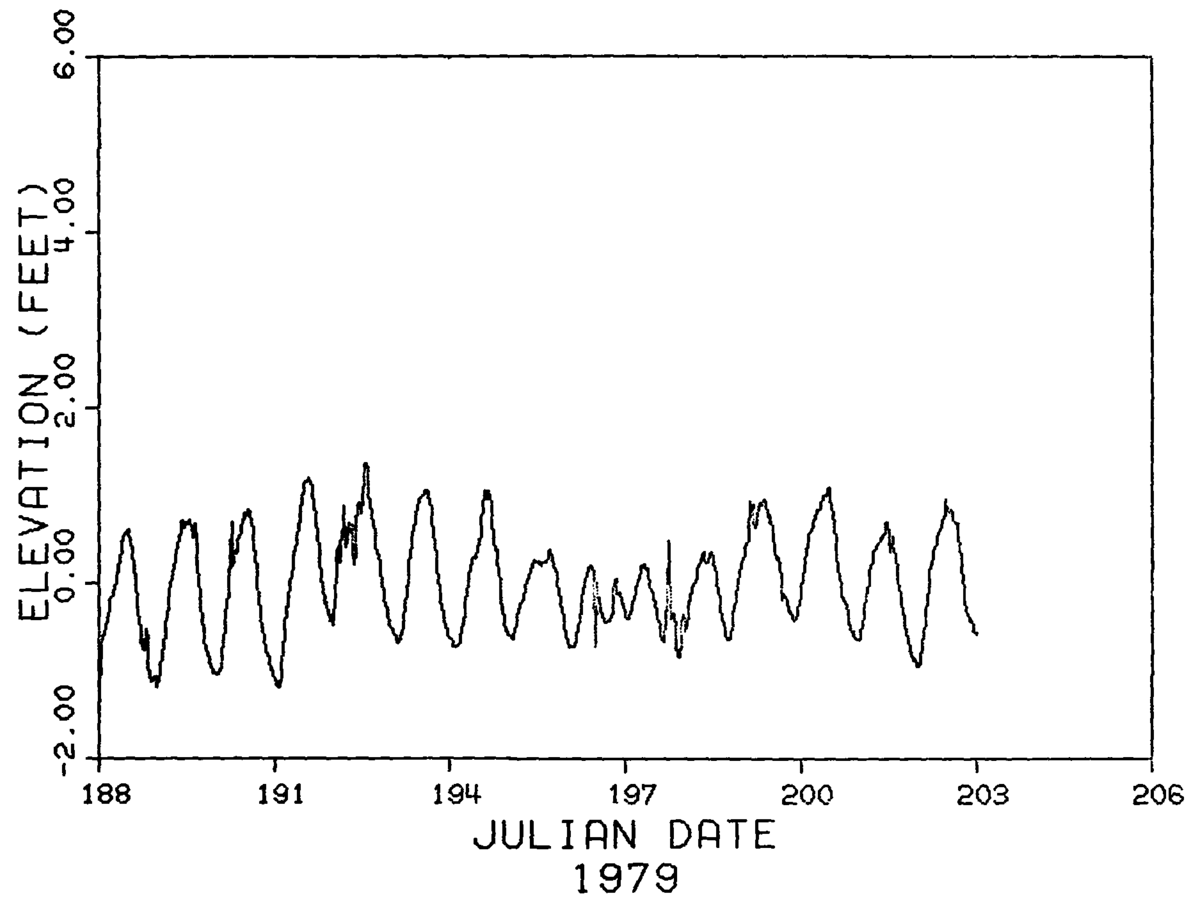


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE B-2

DAY 188 TO DAY 206 1979

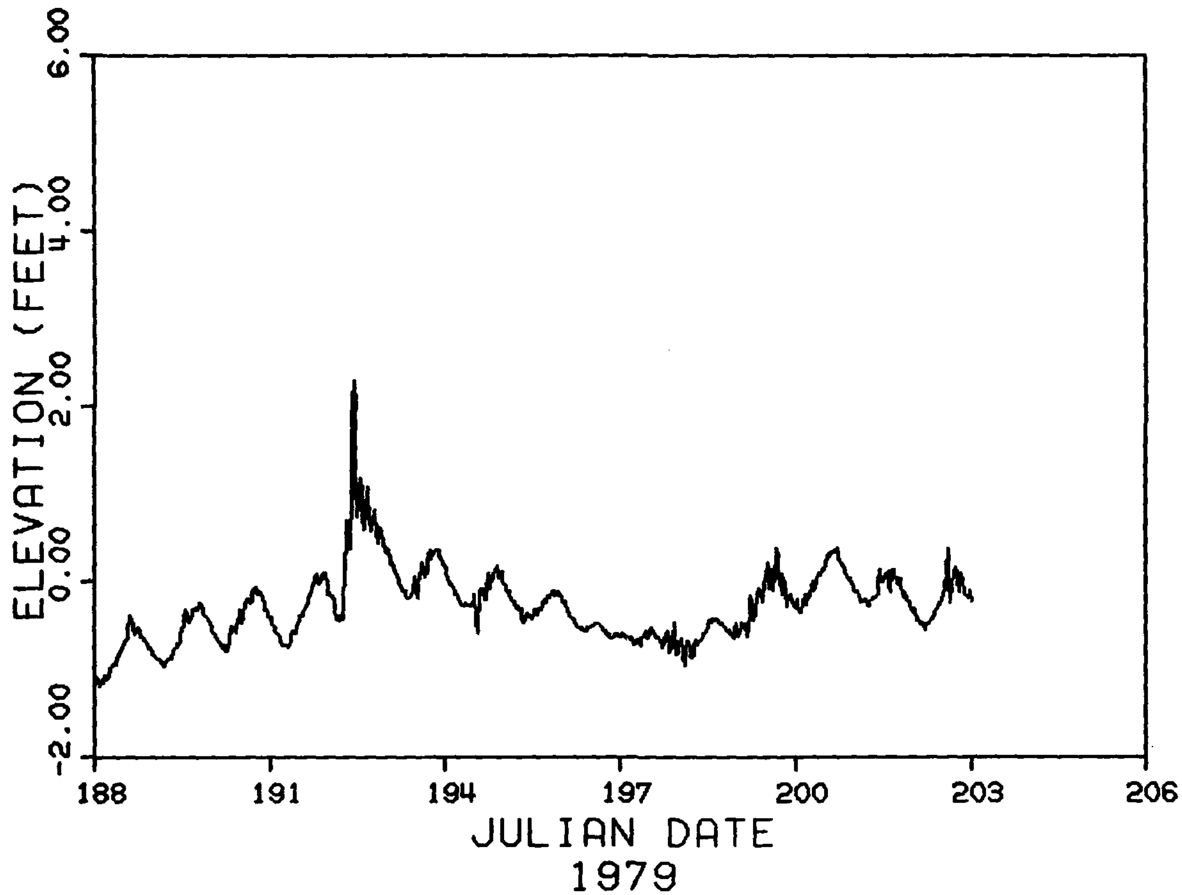


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE B-6

DAY 188 TO DAY 203 1979

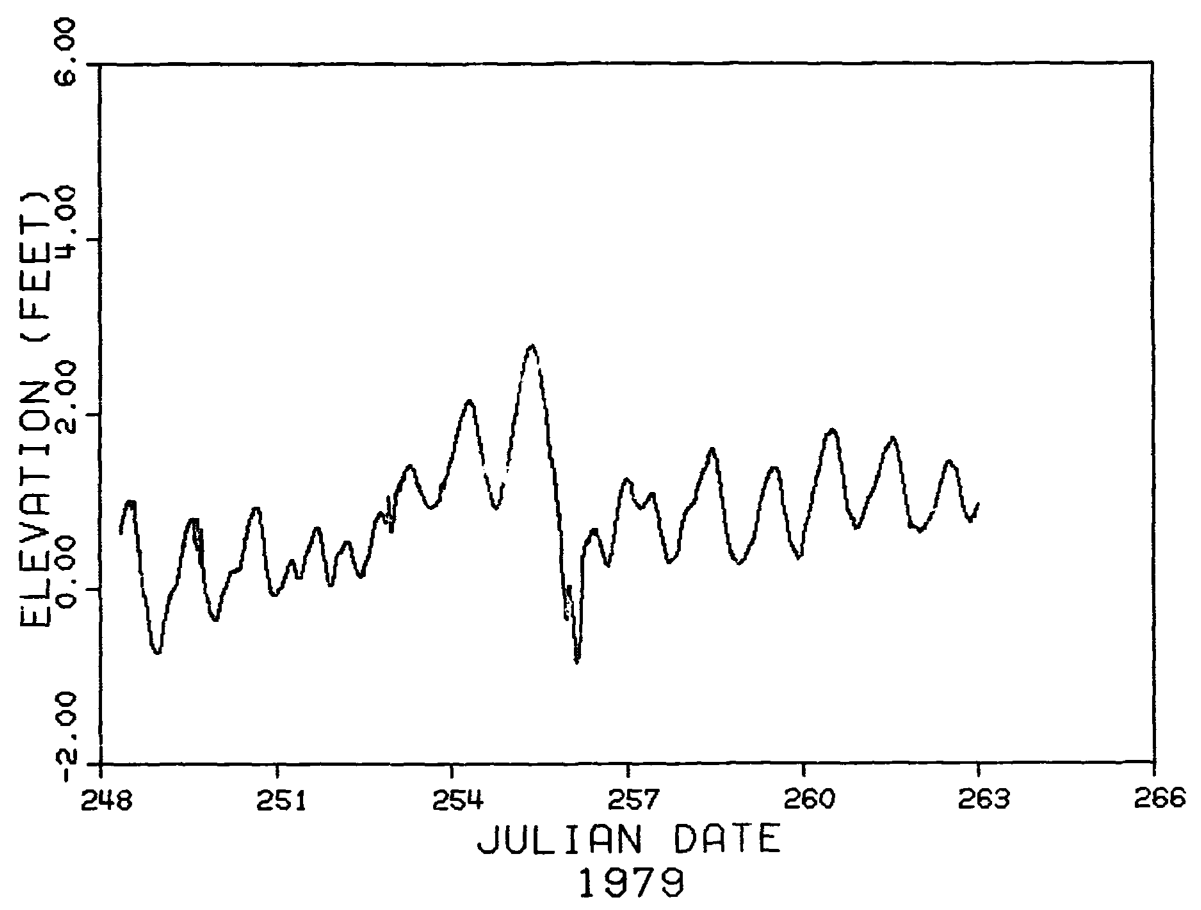


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE P-3

DAY 188 TO DAY 203 1979

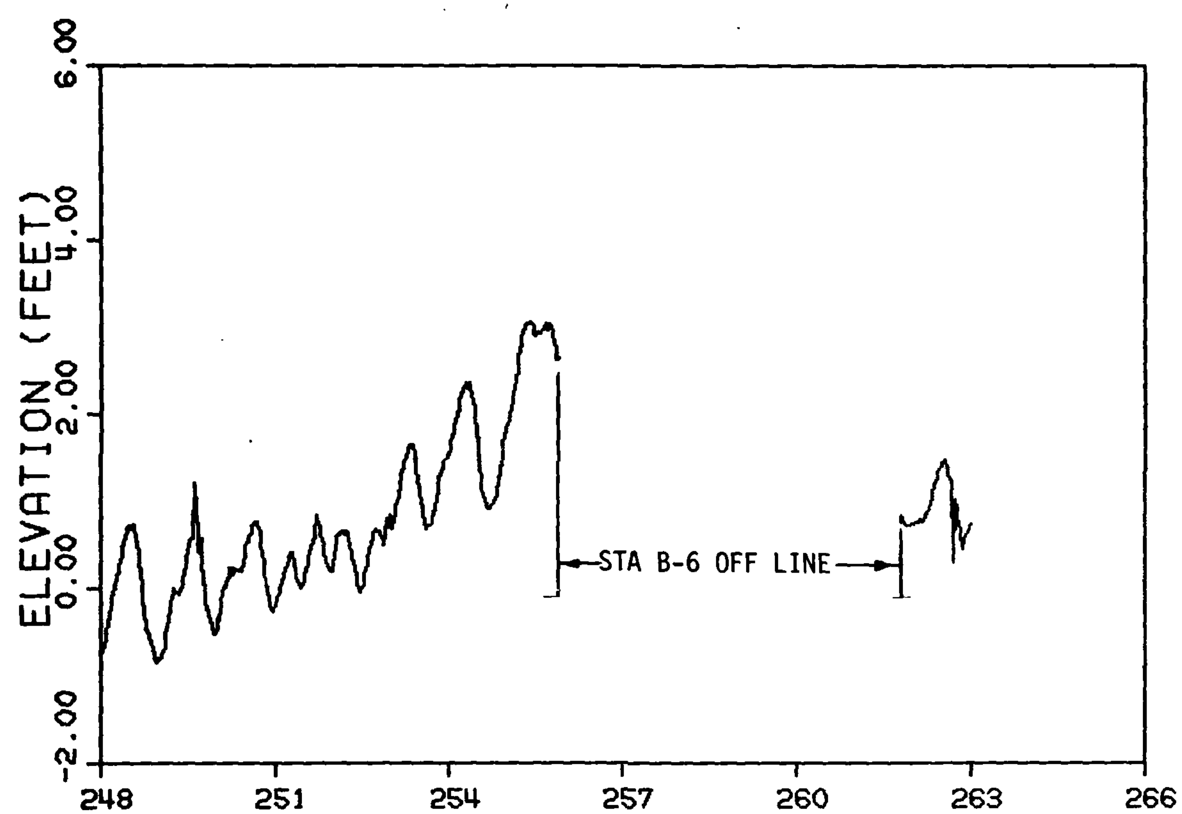


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA

GAGE B-2

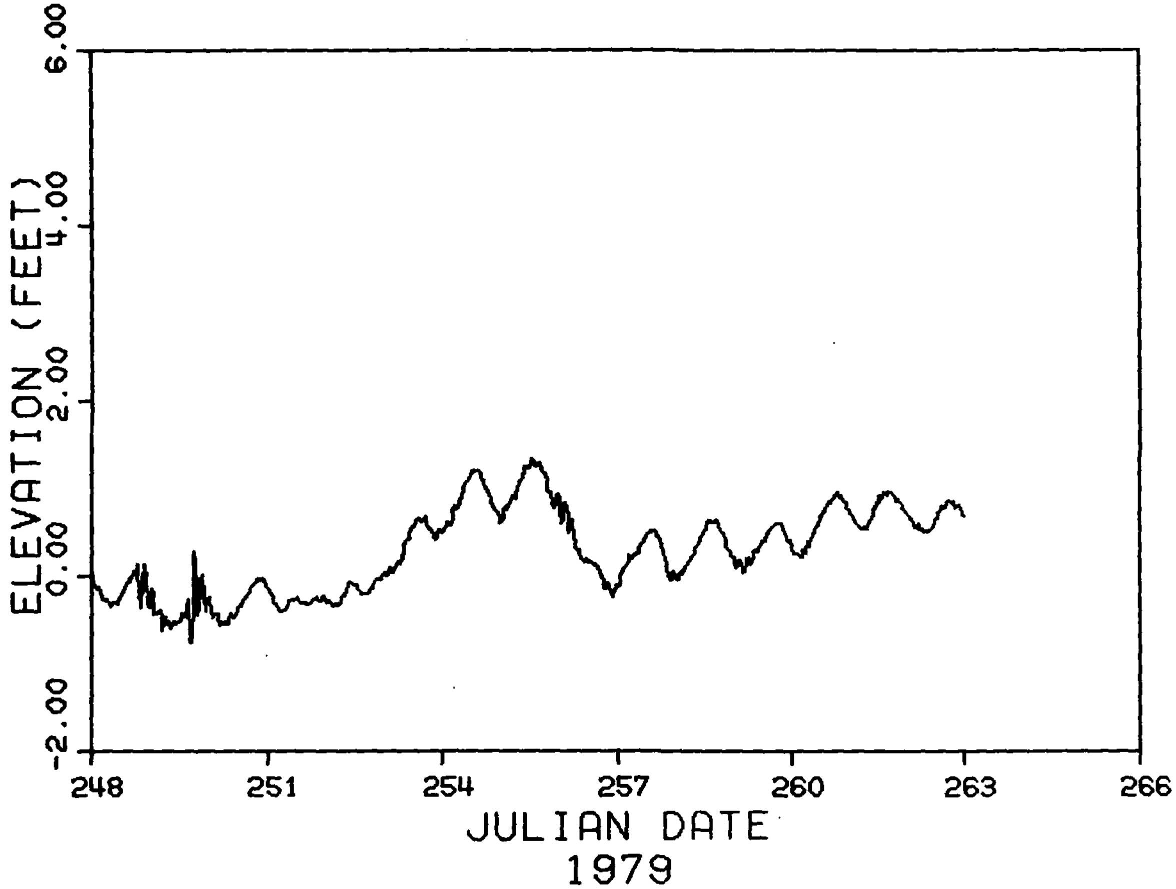
DAY 248 TO DAY 263 1979



JULIAN DATE
1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA
GAGE B-6
DAY 248 TO DAY 263 1979



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

OBSERVED TIDE ELEVATION DATA
GAGE P-3
DAY 248 TO DAY 263 1979

APPENDIX E: PROTOTYPE DATA FOR TIDAL MODEL VERIFICATION

Verification Data Requirements

1. Surface elevation and current data selected for verification of a numerical tidal circulation model of the study area included:

   a. O1 tidal constituent surface elevation and current data throughout the study area.

   b. Observed spring tide surface elevation and current data for Julian day 290 through 294 in August 1978 and Julian day 307 through 311 in November 1978.

   c. Observed neap tide surface elevation data for Julian day 236 through 240 in August 1979.

   d. Predicted constituent tide data for the verification periods.

The first spring tide verification period for days 290-294 corresponds with the initial intensive current survey and the 25-hr velocity survey over the six ranges in the tidal passes and ends as the tide reaches maximum range. During days 307 through 311 the tidal elevation range is a maximum on day 309. The neap tide period corresponds with the supplemental current survey. The O1 constituent, spring, and neap tide data also will be used during verification of detailed numerical models of The Rigolets, Chef Menteur, IHNC, and a numerical channel model of the IHNC and MR-GO complex.

2. Additional prototype data for tidal model verification were available from LMN tide gages and data from the following four LMN stations were used:

LMN Gage No.	Location
85675	Irish Bayou at Lake Pontchartrain
85700	The Rigolets at Lake Pontchartrain
85725	The Rigolets at Lake Borgne
85750	Chef Menteur near Highway 90 Bridge

Locations of the four LMN gages are shown in Figure E1.

3. In the constituent surface elevation and current harmonic

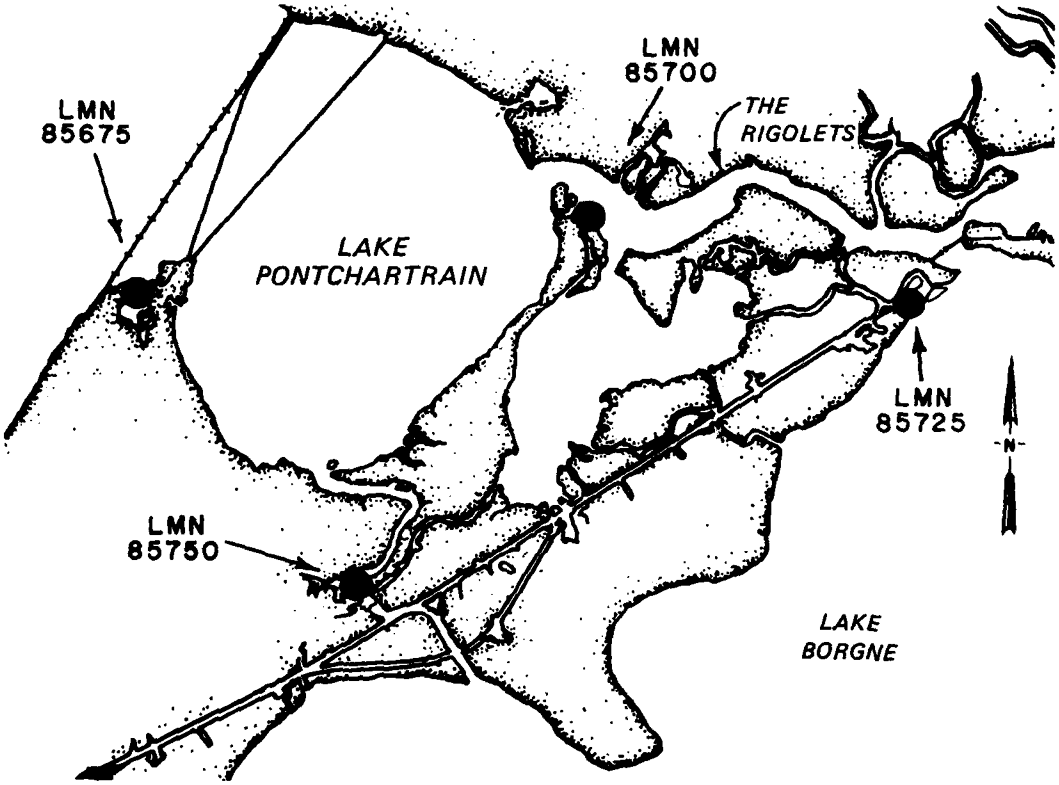


Figure E1. Location of LMN tide stations

analysis results discussed in paragraphs 43 through 47 and 59 through 62 in the main report, relatively little tidal energy (less than one percent) was found at periods less than the semidiurnal range. Due to the low tidal energy levels, the observed prototype data were filtered to attenuate trends with a period less than 10 hr; the filter response is shown in Plate E1. The filter response near the diurnal period range is unchanged from that used in the constituent analysis. Diurnal and semidiurnal tidal constituent analysis results also are used to calculate constituent tidal elevations for stations where observed data were not available during the verification periods.

Observed Tidal Elevation and Current Data

4. The O1 constituent tide calculated from the 6-month tide

records (see Table 8 of main report) is shown for the first spring tide period, day 290 through 294 in 1978, for 16 tide stations for which analysis results are available in Plates E2-E17. Similar O1 constituent data are presented for currents (see Table 12 of main report) at sta V1, V2, V3, V4, V5, V6, V8-S, V10-S, V11-M, V12-M, V13, and V21-S in Plates E18-E29. Current data at middepth are used at all stations except V8-S, V10-S, and V21-S where middepth data were not available. Phase lag from station to station can easily be seen for the O1 constituent.

5. Observed spring tidal elevation data filtered to attenuate periods outside the semidiurnal to diurnal range for sta B-2, B-3, B-4, B-6, M-1, P-1, P-2, P-4, P-5, P-6, P-7, and R-1 for Julian day 290 through 294 are shown in Plates E30-E41. Observed velocity data, again filtered, at sta V1 through V6, V8-S, V10-S, V11-M, V12-M, V13, and V21-S are shown in Plates E42-E53. The influence of strong winds near day 290 (Plates 239 and 240 in main text) can be seen in the tide and velocity data for day 290. However, winds decreased after day 290 and had less effect on the remaining data as shown by the comparison of prototype and constituent analysis data in PART IV (main text) for days 291 through 294 (e.g., see Plate 33 for sta B-2 in main text).

6. Spring tide surface elevation during Julian day 307 through 311 in November 1978 for tide sta B-2 through B-6, M-1, P-2, P-4 through P-7, and R-1 are shown in Plates E54-E65. Observed velocity data generally end near day 311; however, 50 hr are deleted from the ends of each velocity record to remove filter effects and the remaining record is not adequate to use for verification. Constituent velocity data, however, are presented later. As shown in Plates 239 and 240 in the main report, winds observed at WS-1 on Lake Pontchartrain were relatively calm for several days immediately preceding day 307 and did not exceed 10 mph until day 310.

7. Observed neap tidal elevation data, filtered, for sta B-2, B-3, B-4, B-6, M-1, P-3, P-5, P-6, P-8, P-9, and R-1 are shown in Plates E66-E76 for day 236 through 240. Observed current data, filtered, at sta C5, C8, C9, C10, C13, C14, C15, C16, and C21 are shown in

Plates E77-E85 for the same time period. During the selected neap tide period, the range of the tide was less than 0.8 ft at sta B-2 at the mouth of the Pearl River compared with 1.6 ft for the spring tide. In Lake Pontchartrain at sta P-5 on the southern end of the Lake Pontchartrain Causeway Bridge, the tidal range was 0.35 ft for the neap tide, compared with 0.46 ft for the spring tide. However, the minimum range of the tide at sta P-5 during the neap period was near 0.1 ft. Although the filtered currents are similar in magnitude at similar stations during the spring and neap tide periods, the semidiurnal components are more apparent in the neap tide current data.

8. Observed surface elevation data, filtered, for the three tidal verification periods at the four LMN gages are shown in Plates E86-E97. Data from the LMN gages are in excellent agreement with WES observations from nearby tide stations.

Constituent Tide

9. Constituent tidal surface elevations and velocity calculated from harmonic analysis results are presented in Plates E98-E153 for the 16 tide stations and 12 current meter stations for the two spring tide verification periods. Similar constituent tide data are presented in Plates E154-E178 for the 16 tide stations and 9 current meter stations during the neap tide period.

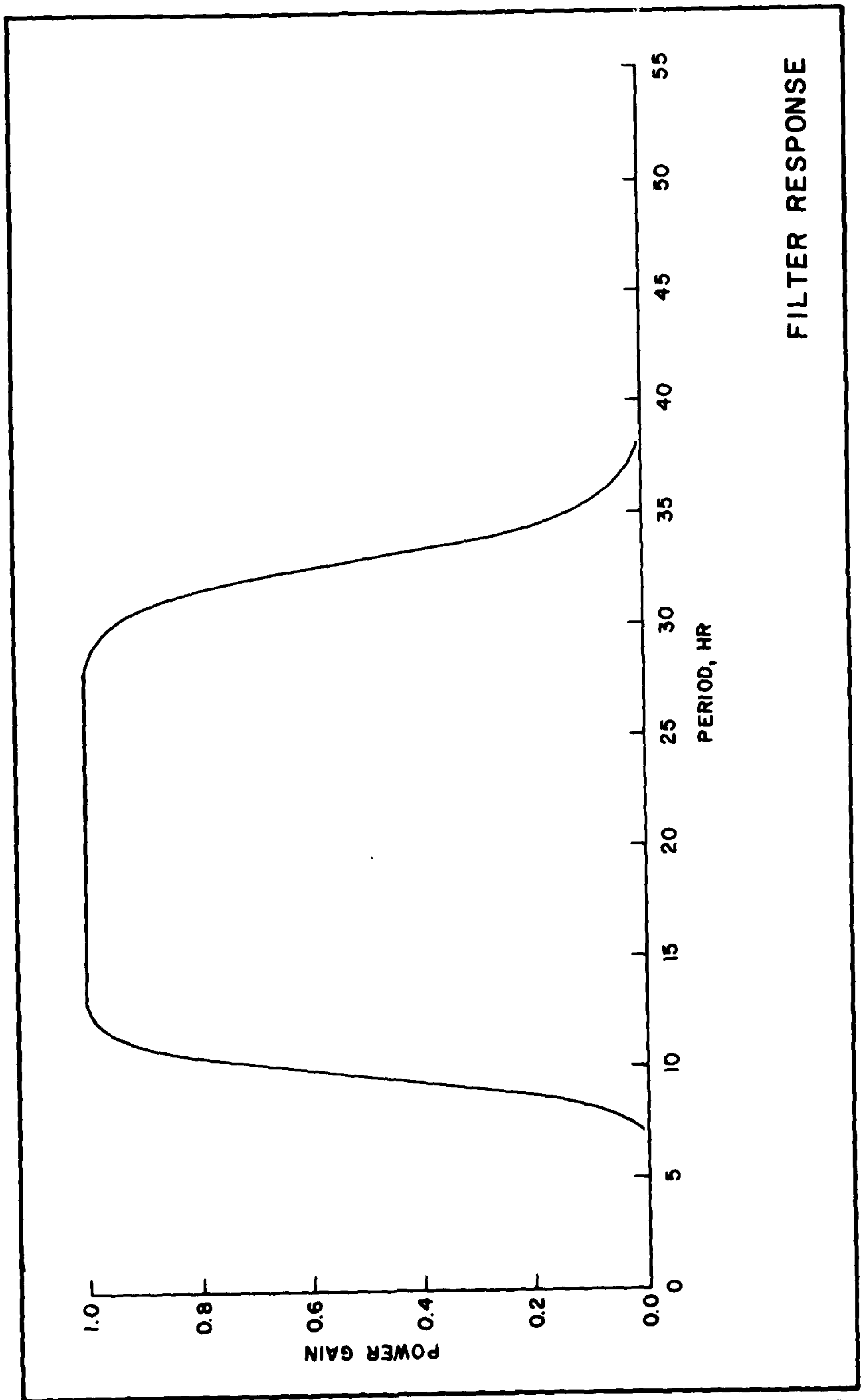
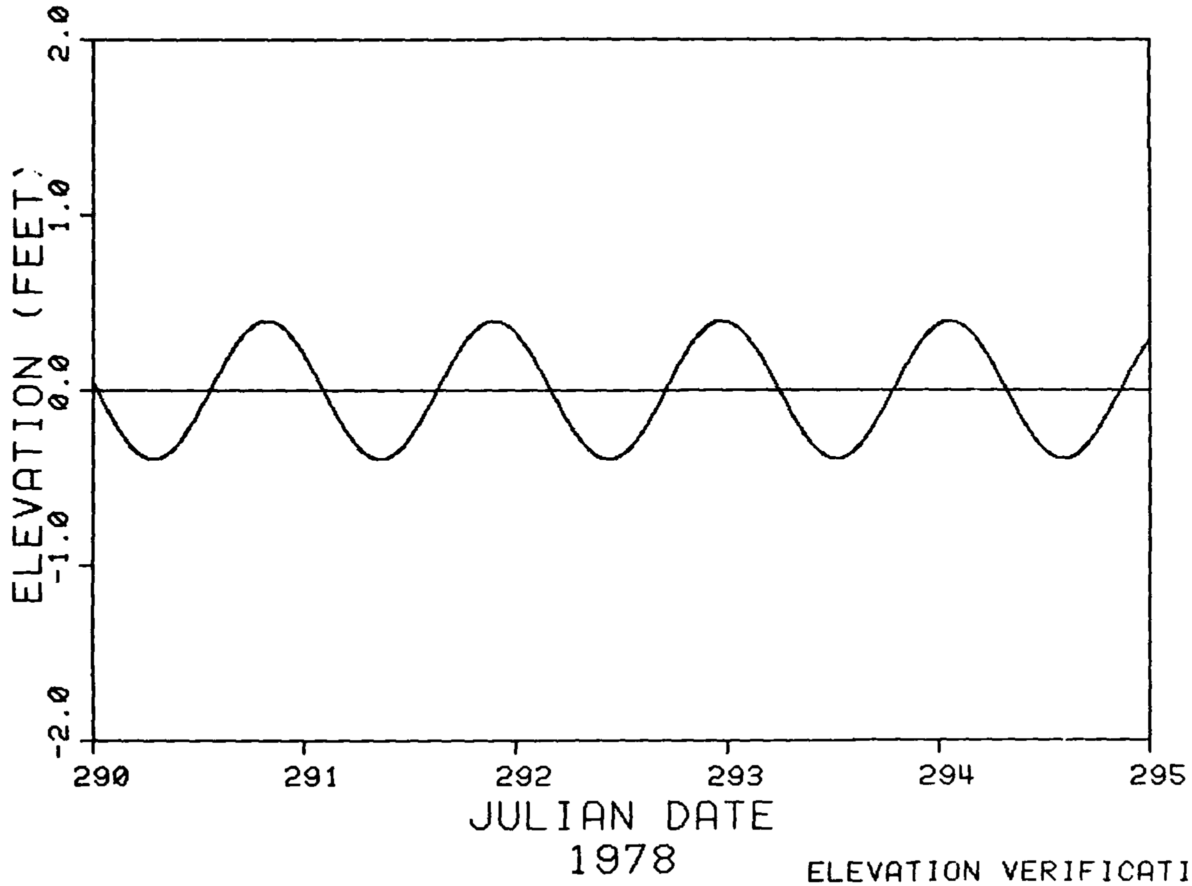

FILTER RESPONSE
POWER GAIN
0.0
0.2
0.4
0.6
0.8
1.0
PERIOD, HR
0
5
10
15
20
25
30
35
40
45
50
55

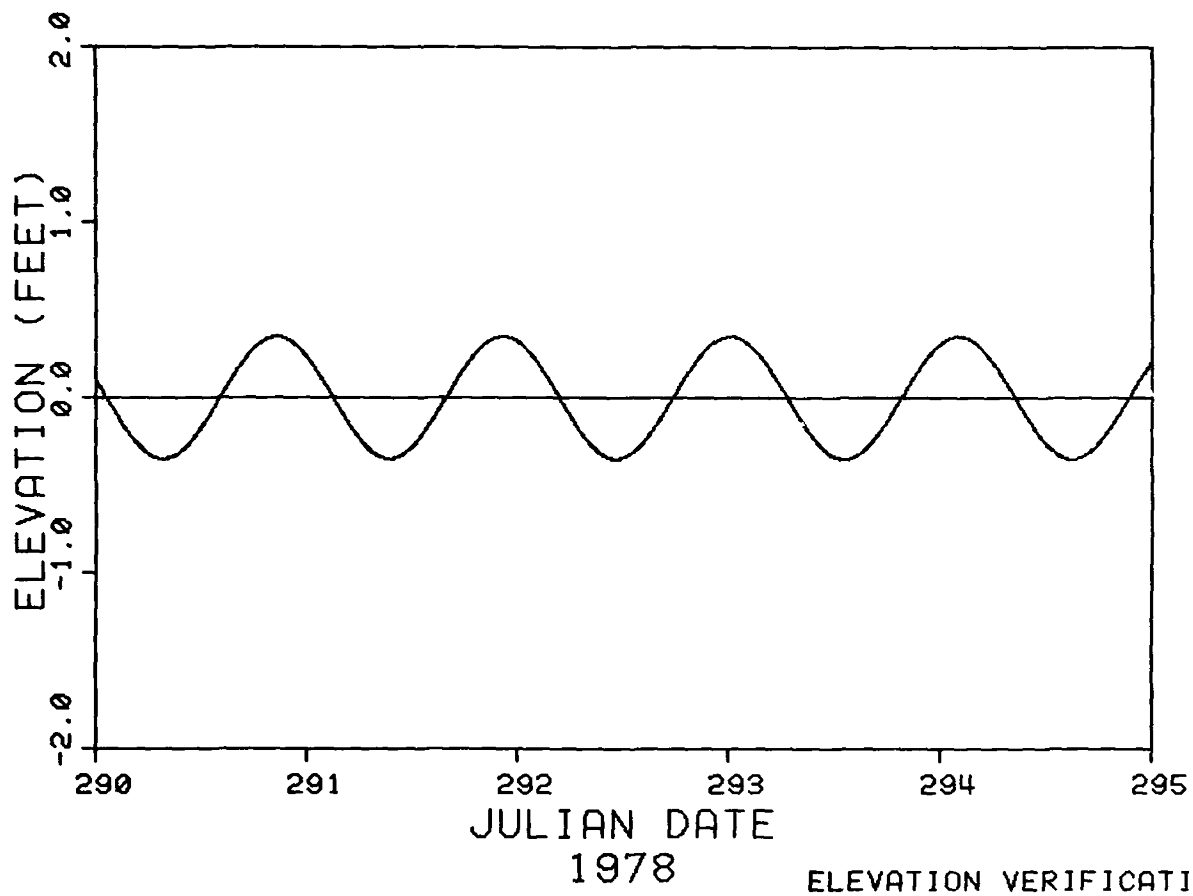
PLATE E1



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE B-1
DAY 290 TO DAY 295 1978

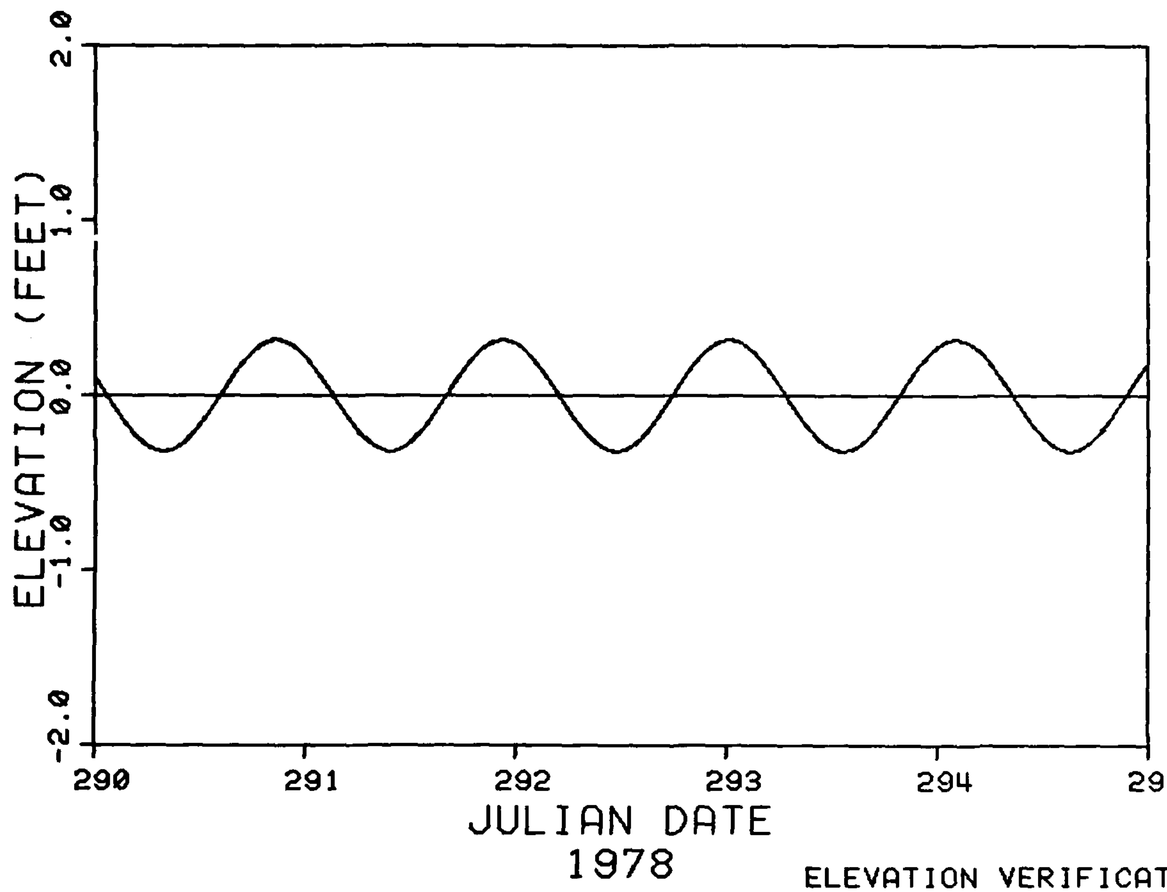
PLATE E2



ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE B-2

DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

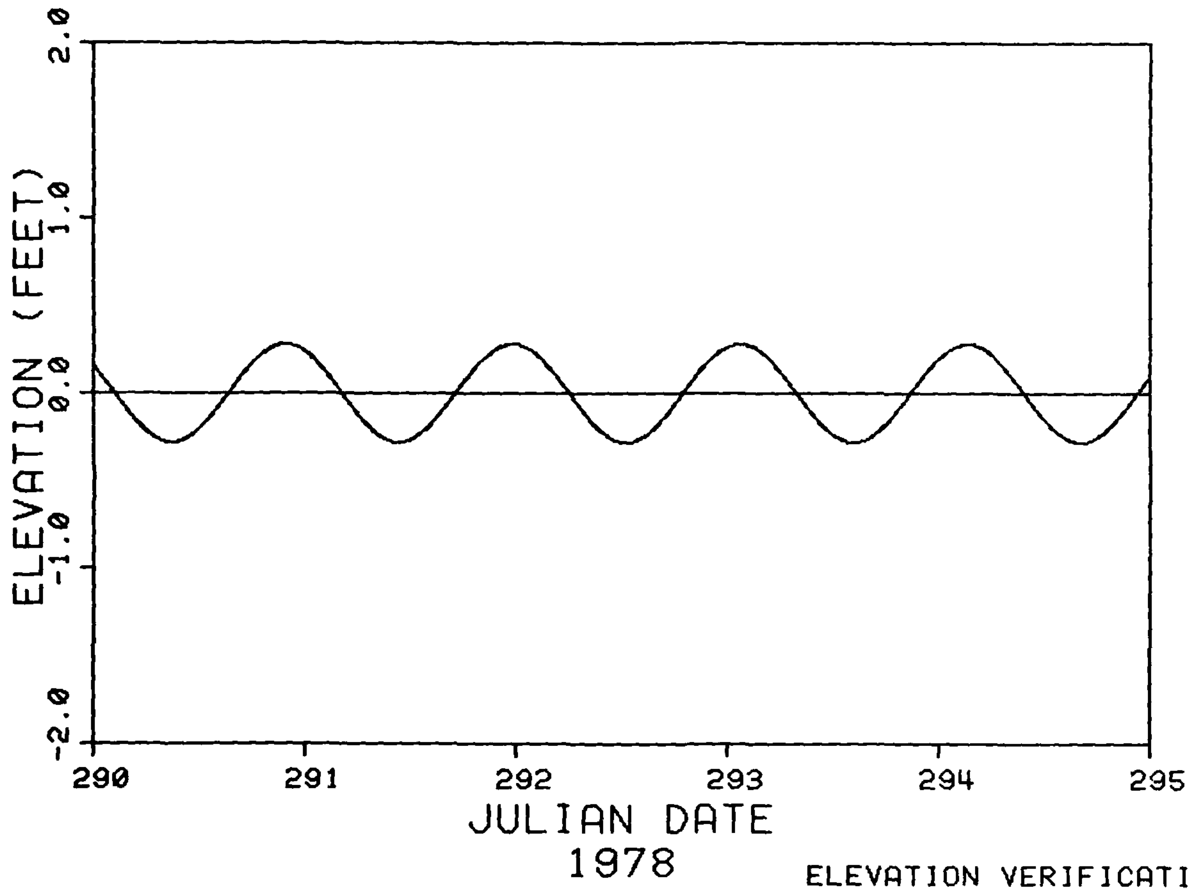


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE B-3

DAY 290 TO DAY 295 1978

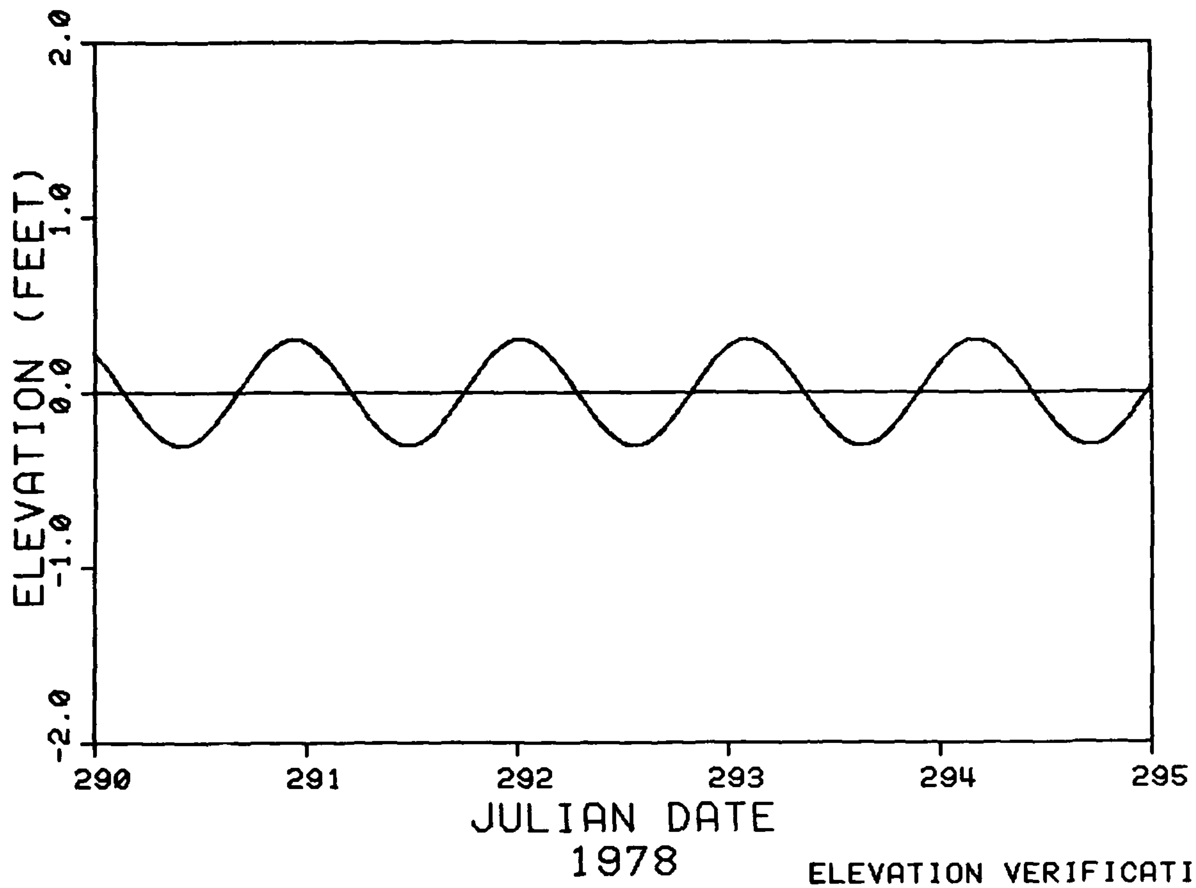
PLATE E4



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE B-4

DAY 290 TO DAY 295 1978

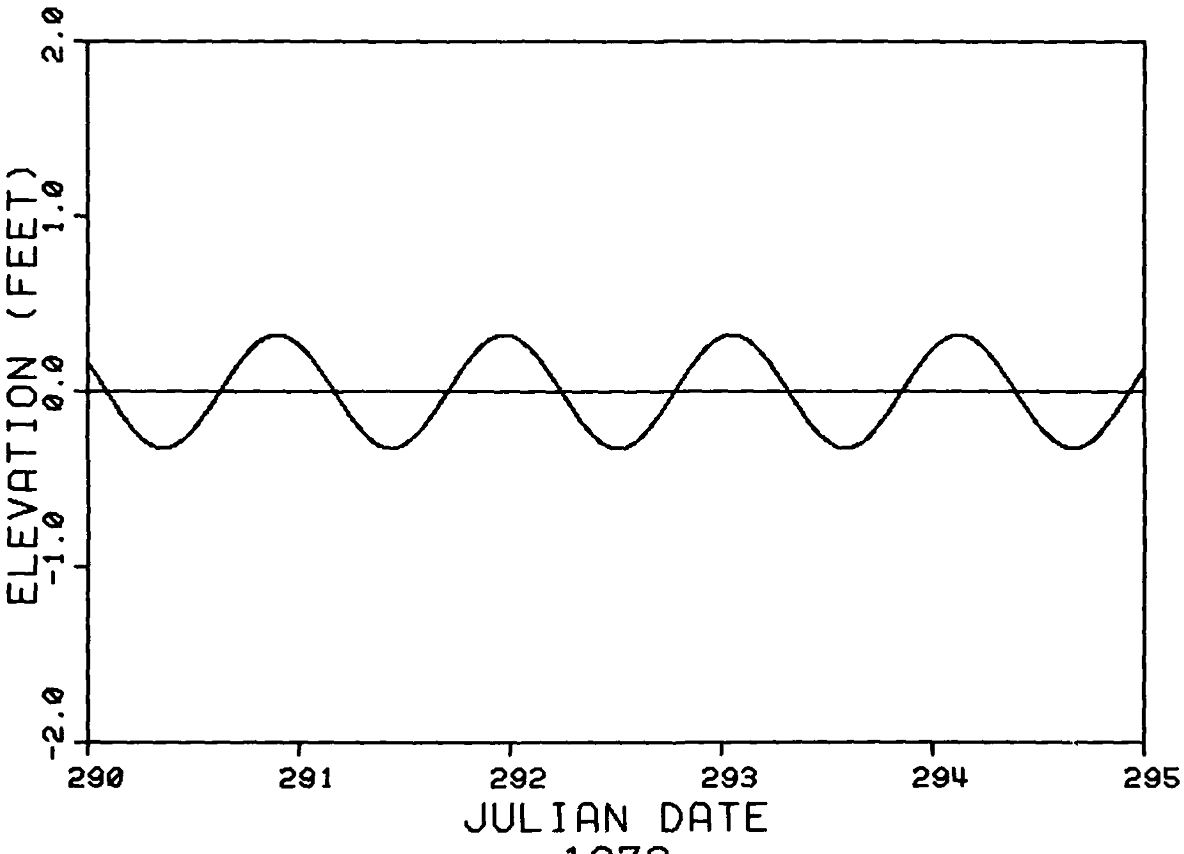


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE B-5

DAY 290 TO DAY 295 1978

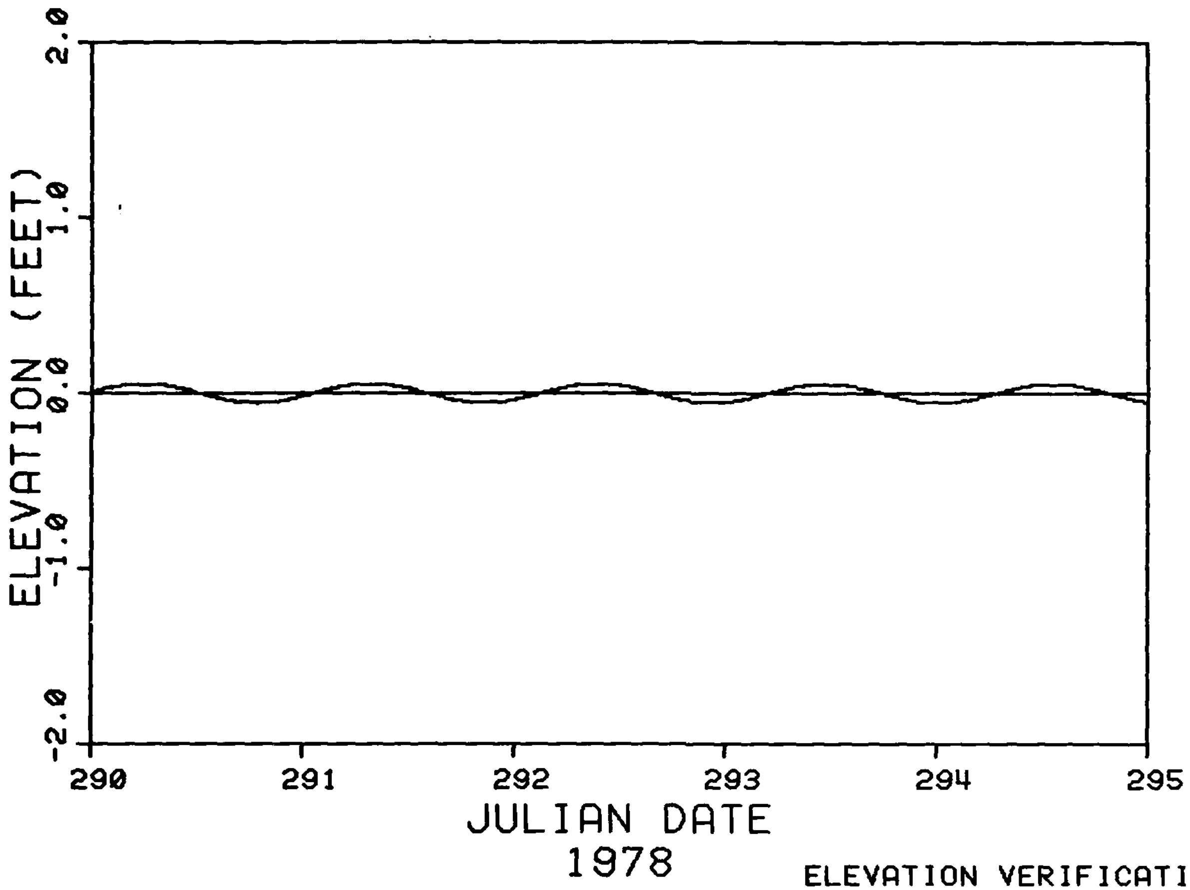
PLATE E6



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE B-6

DAY 290 TO DAY 295 1978

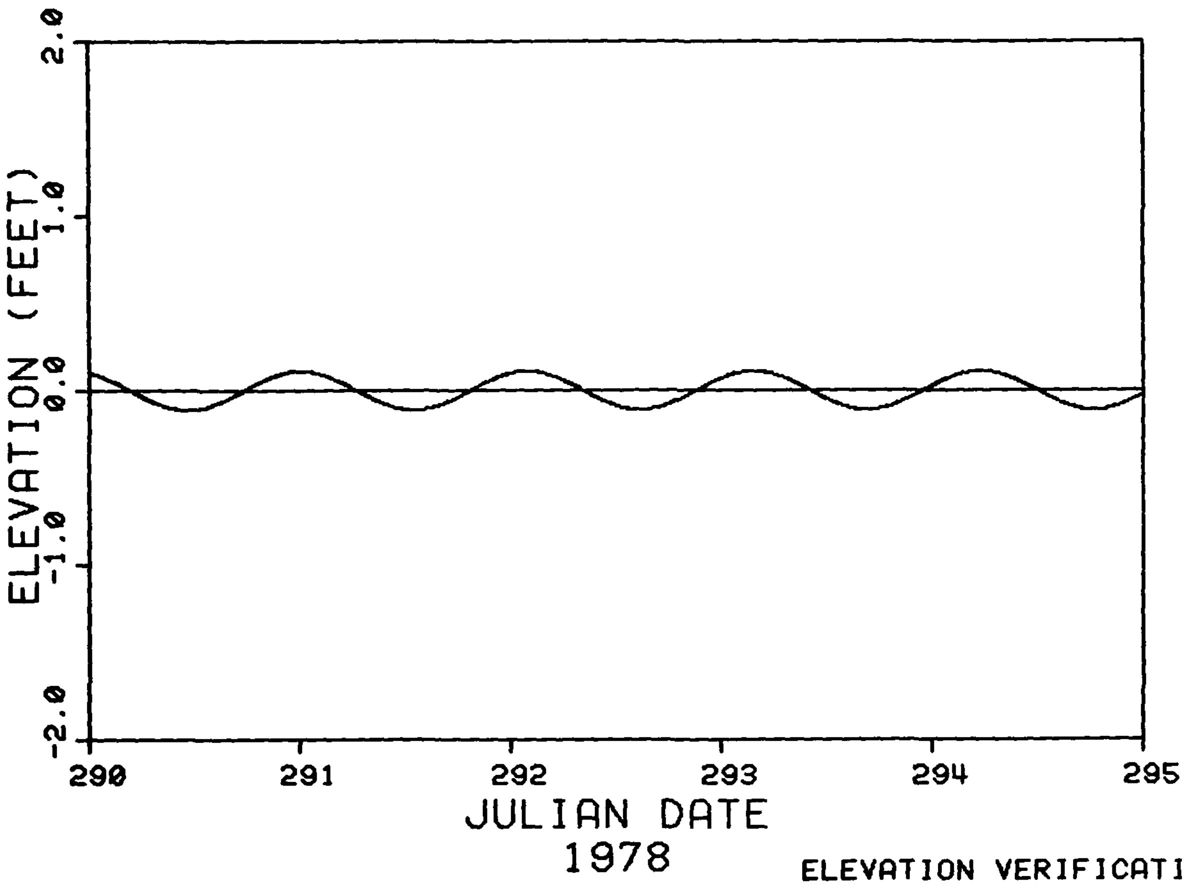


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE M-1

DAY 290 TO DAY 295 1978

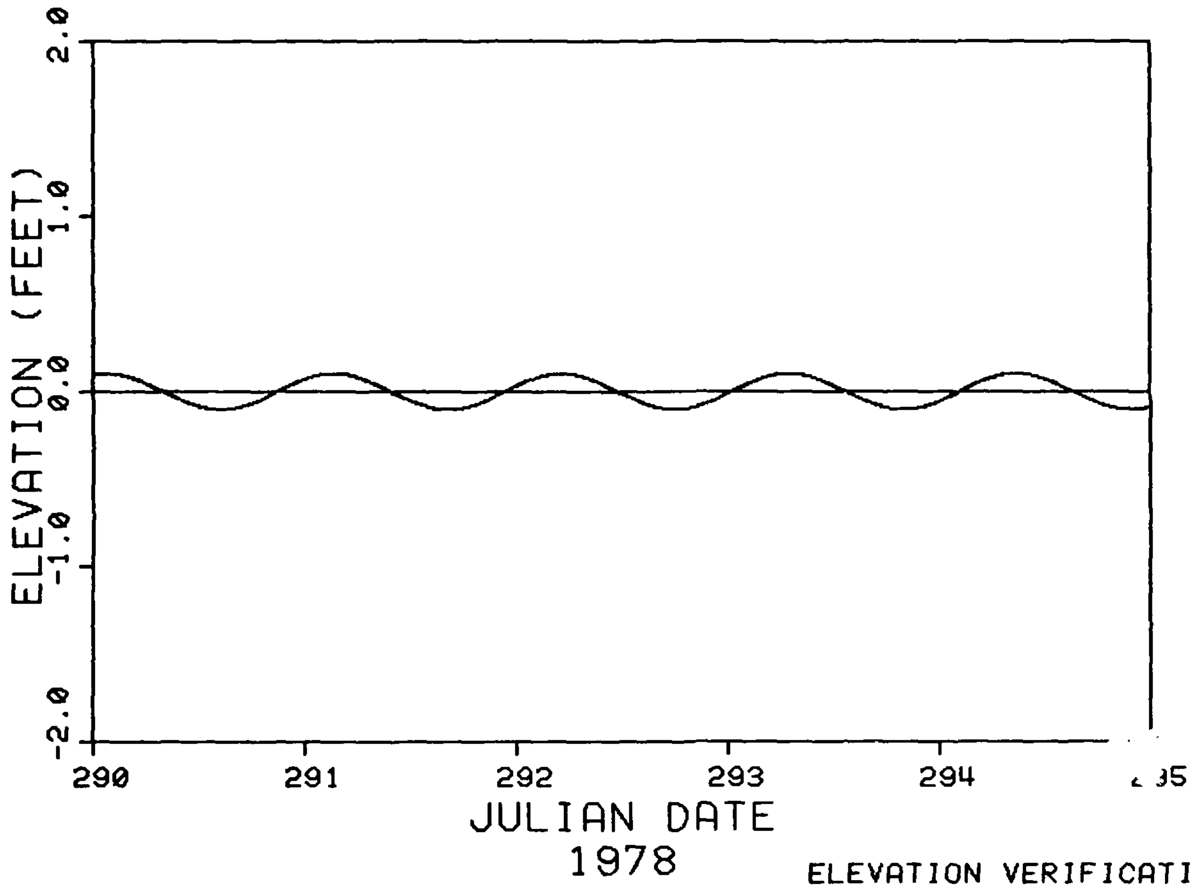
PLATE E8



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE P-1
DAY 290 TO DAY 295 1978

PLATE E9

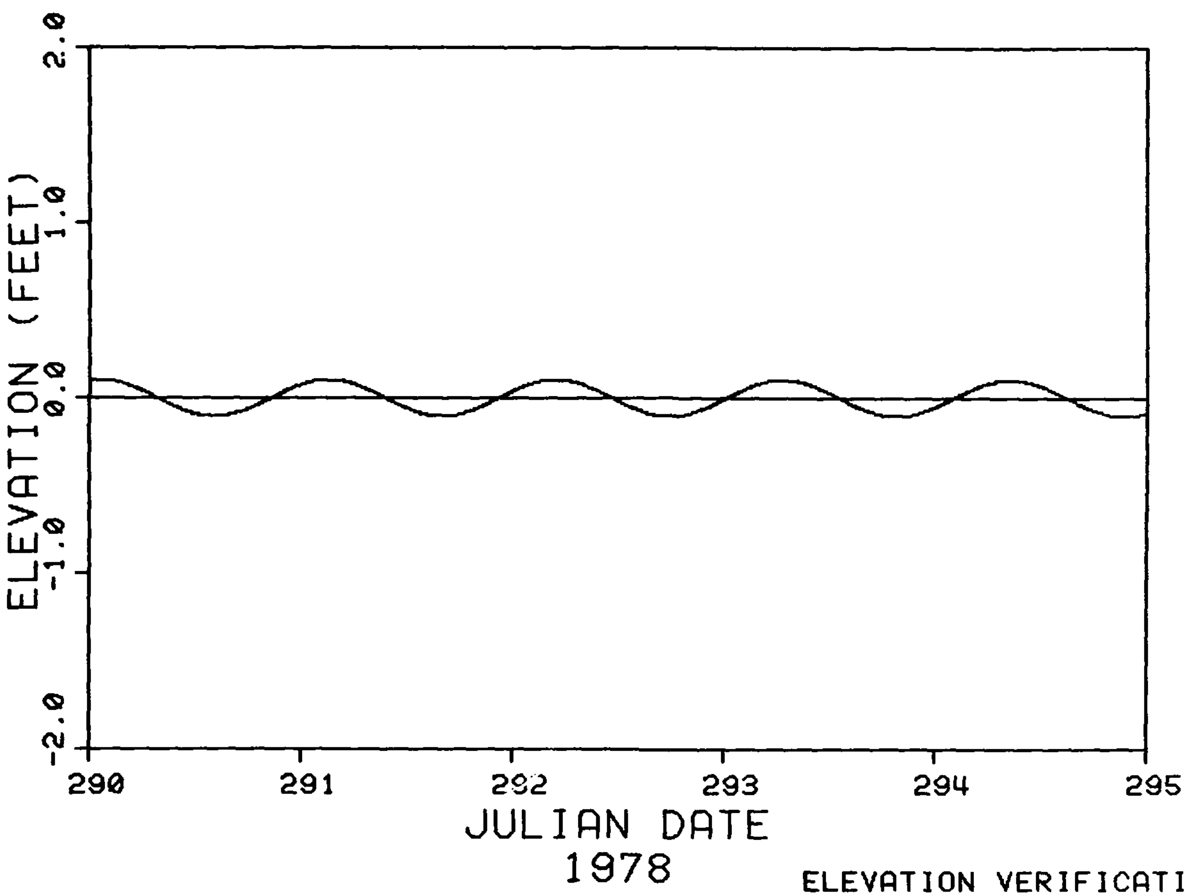


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE P-2

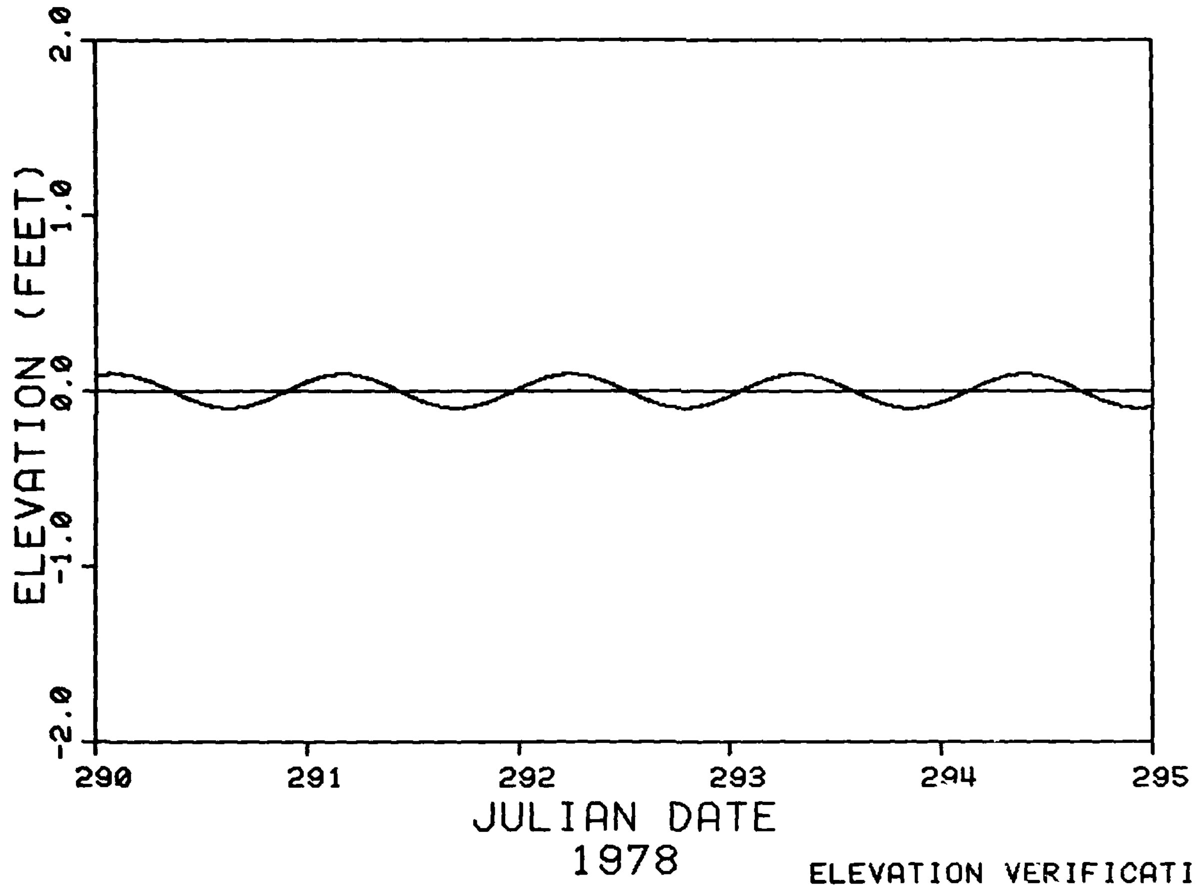
DAY 290 TO DAY 295 1978

PLATE E10



ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE P-3
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

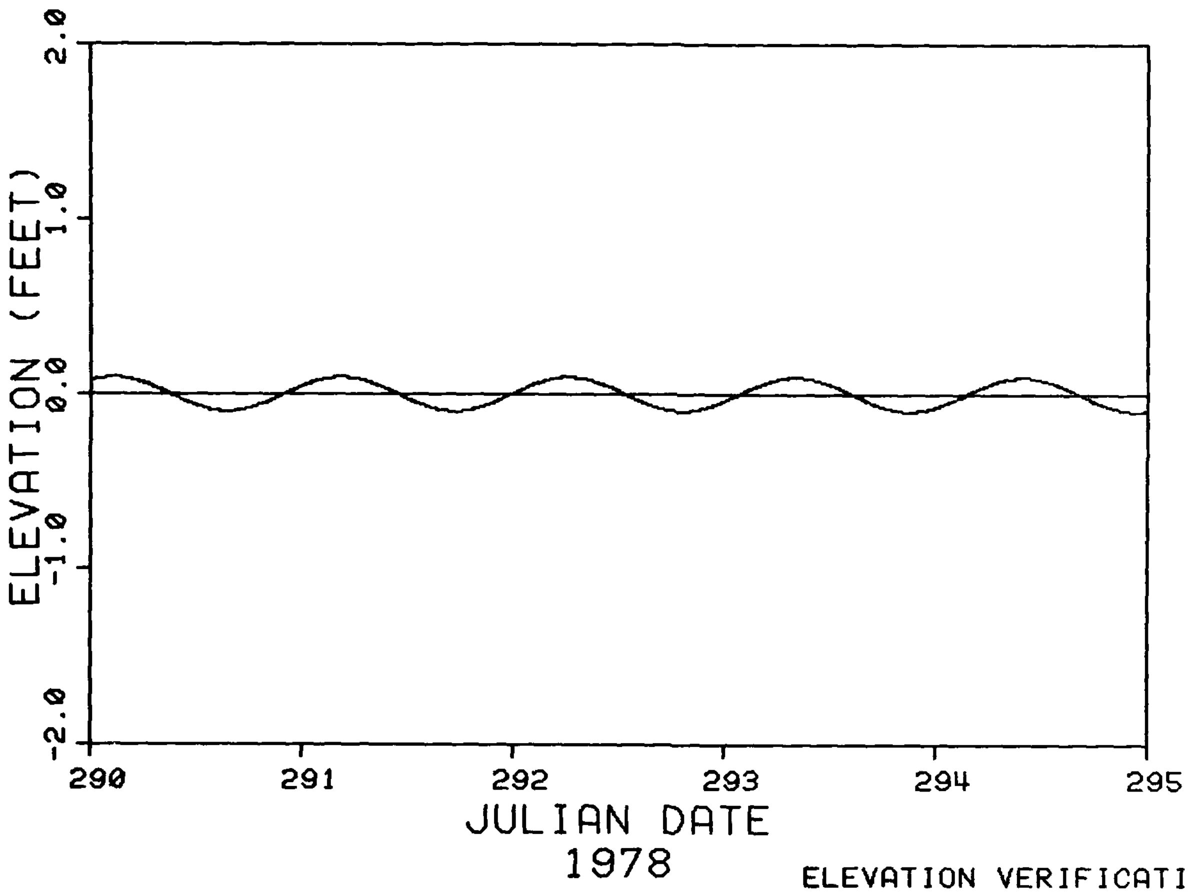


ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE P-4

DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

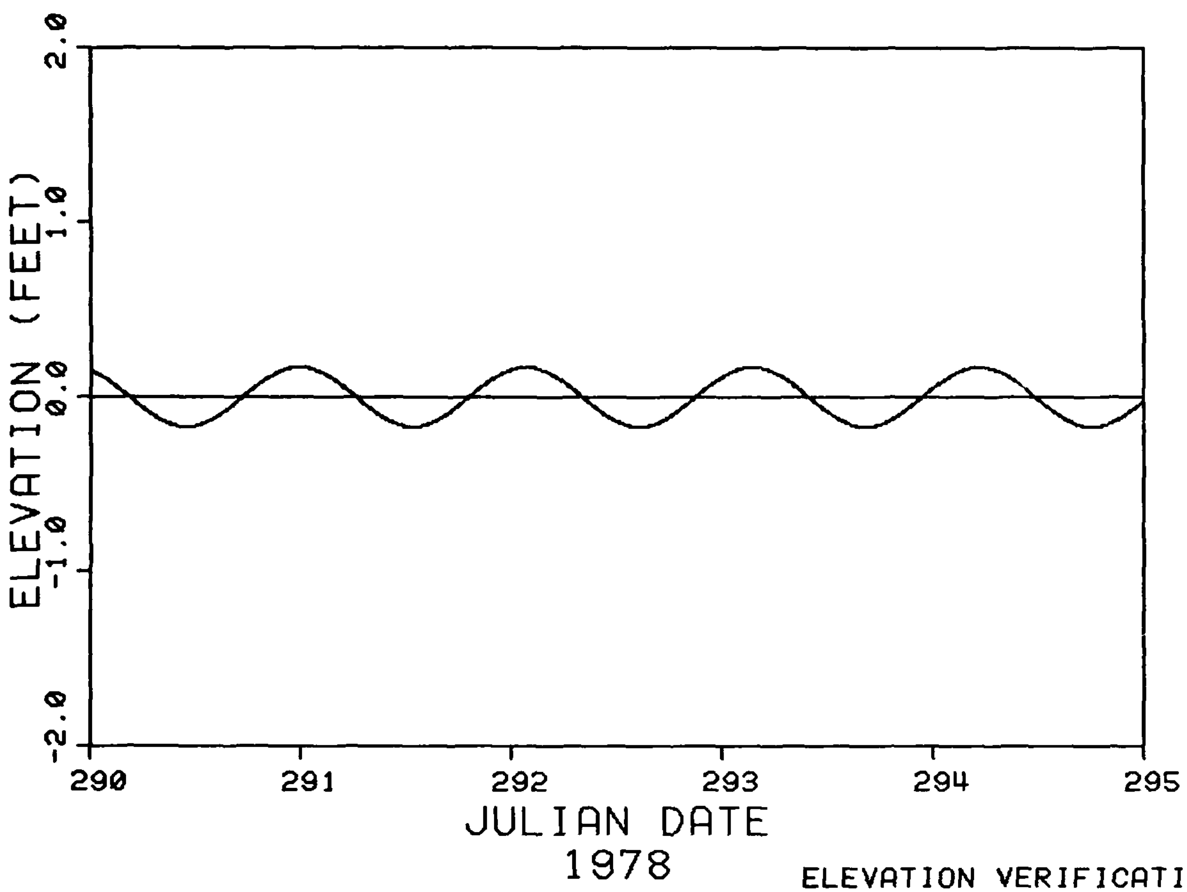
PLATE E12



ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE P-5

DAY 290 TO DAY 295 1978

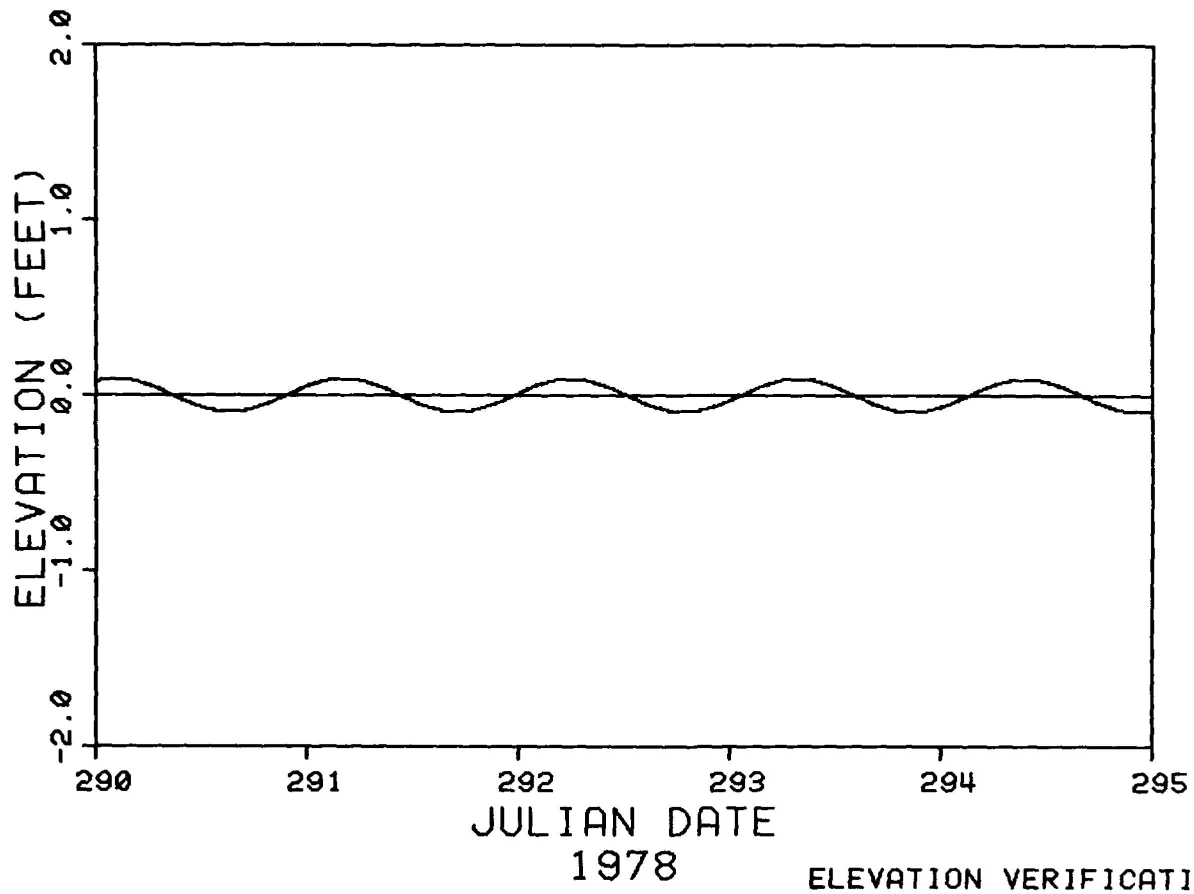
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE P-6
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

PLATE E14



ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE P-7

DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

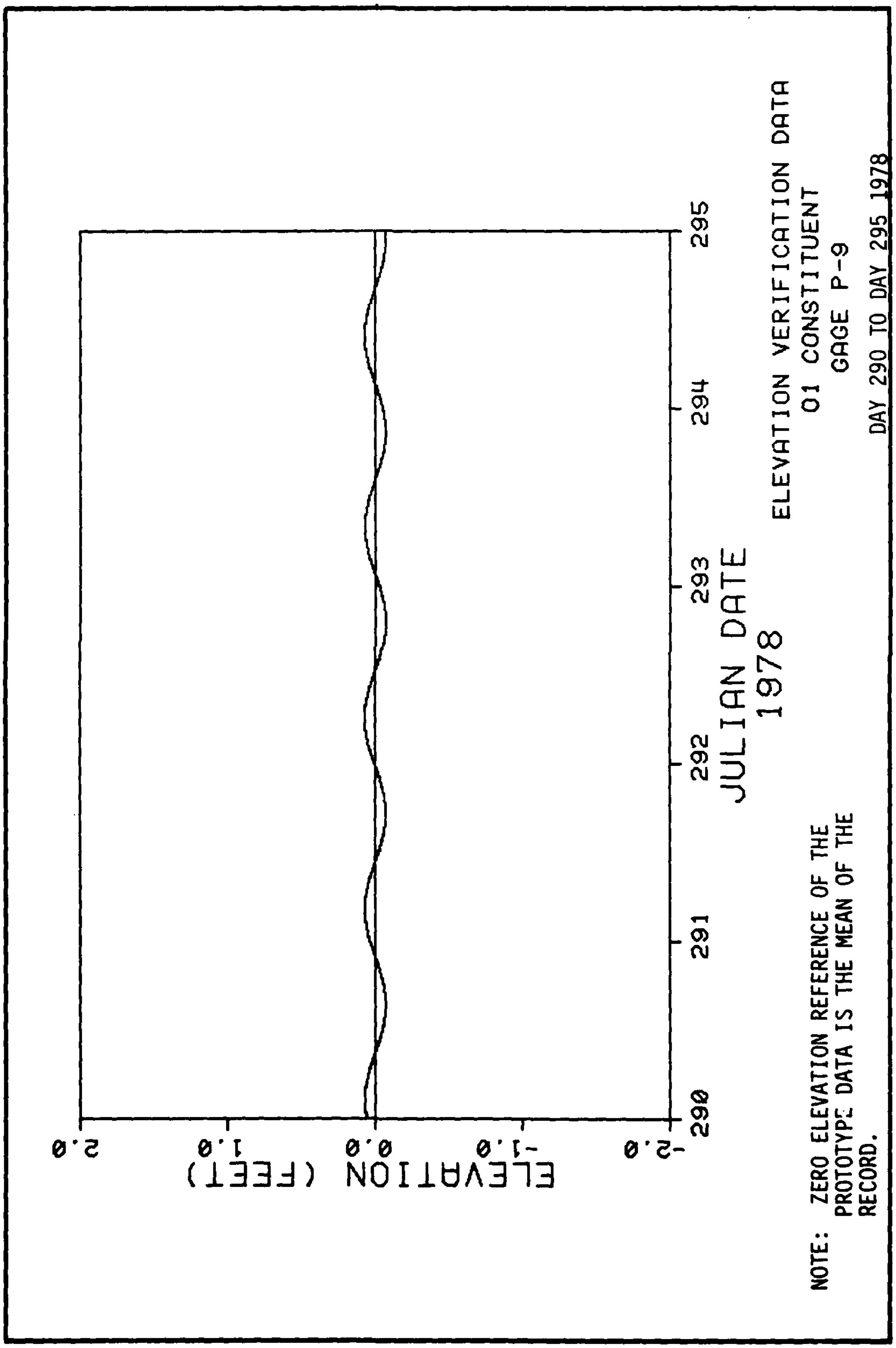
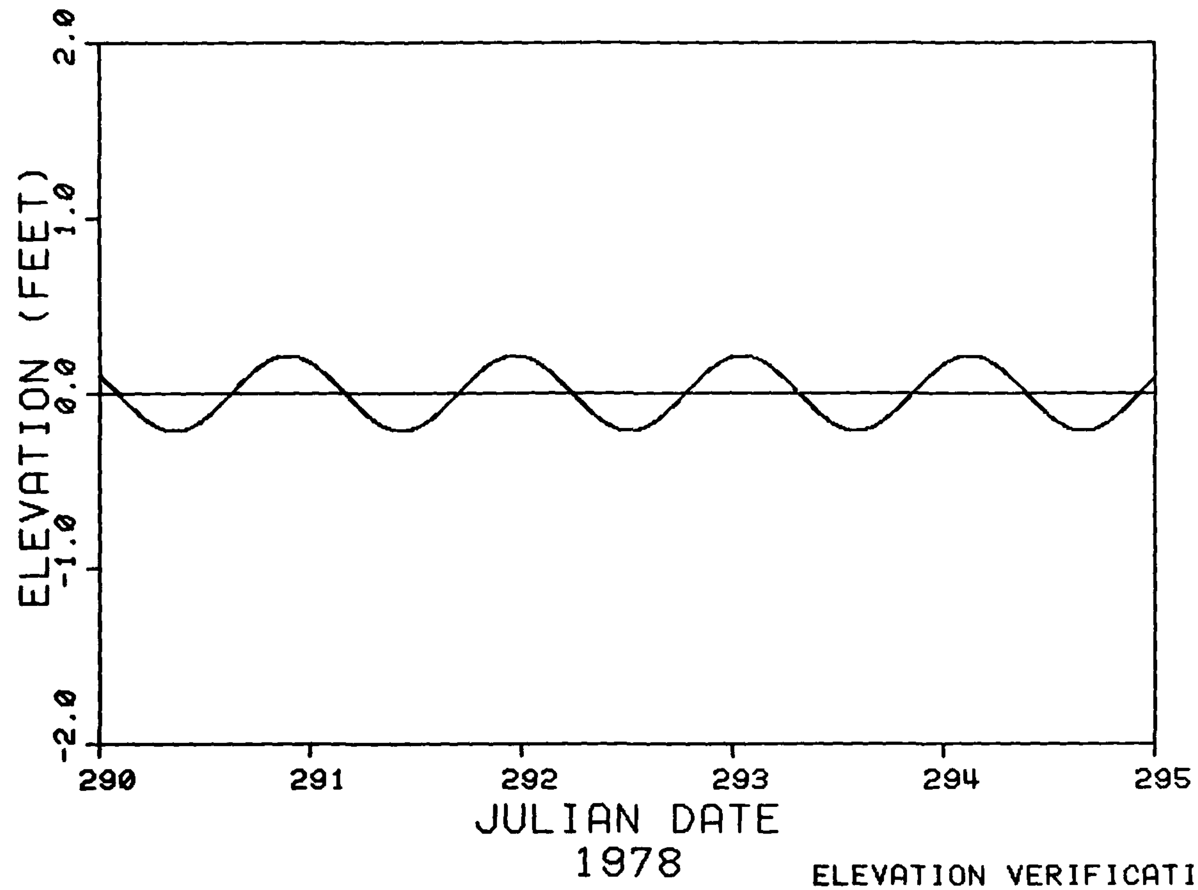

ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE P-9
DAY 290 TO DAY 295 1978
ELEVATION (FEET)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295
JULIAN DATE
1978
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

PLATE E16



ELEVATION VERIFICATION DATA
O1 CONSTITUENT
GAGE R-1
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

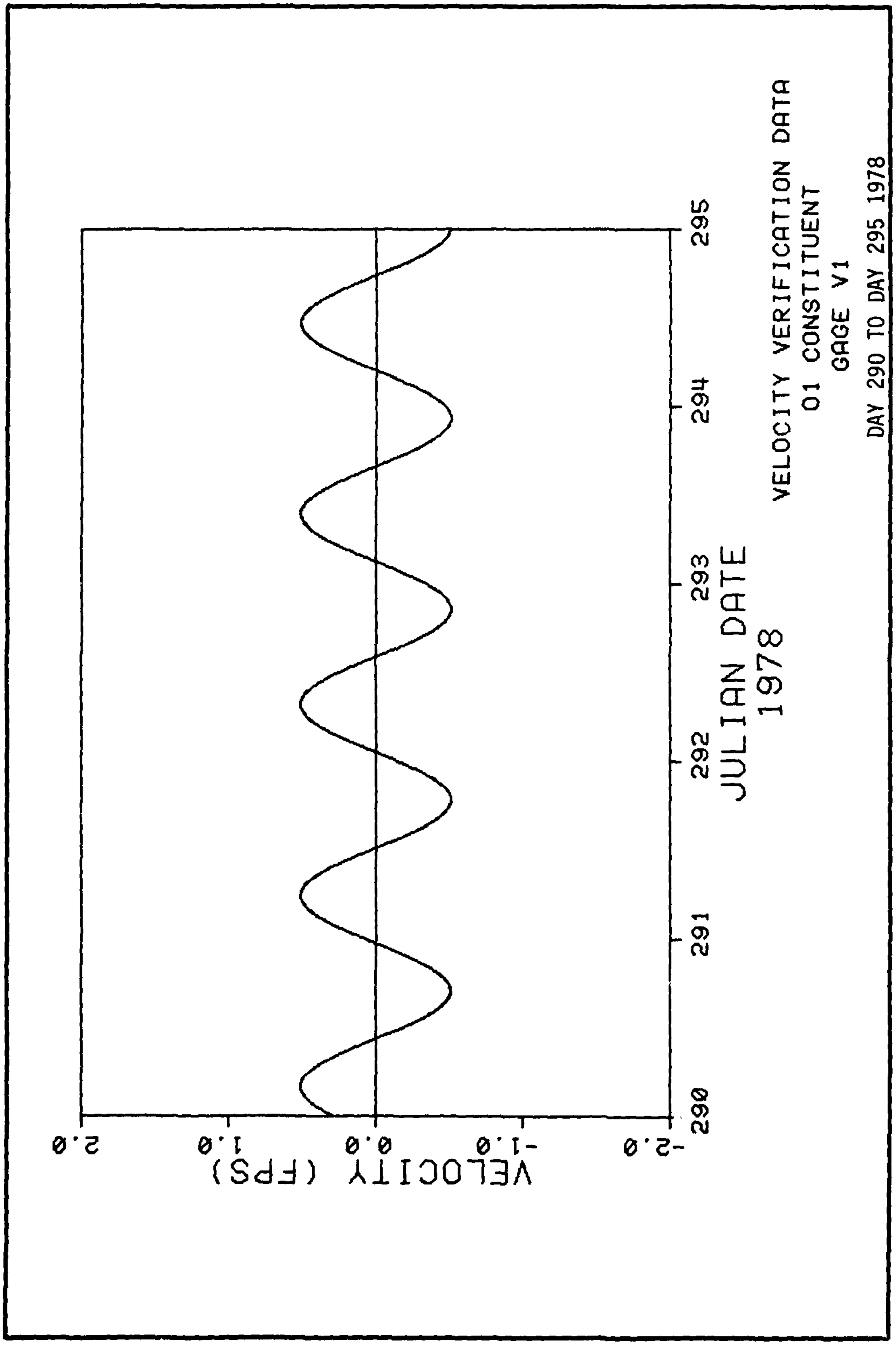

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V1
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E18

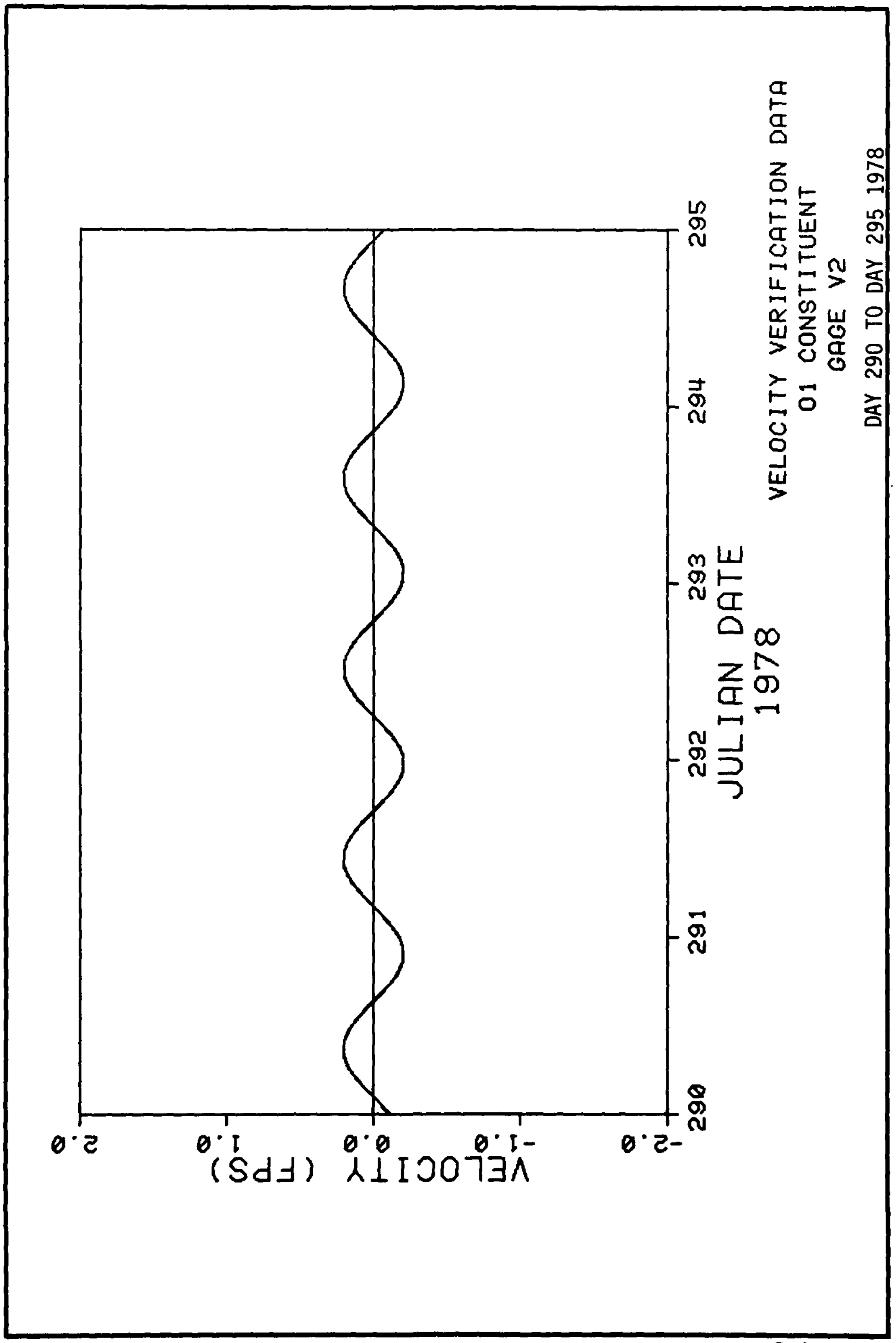

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V2
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E19

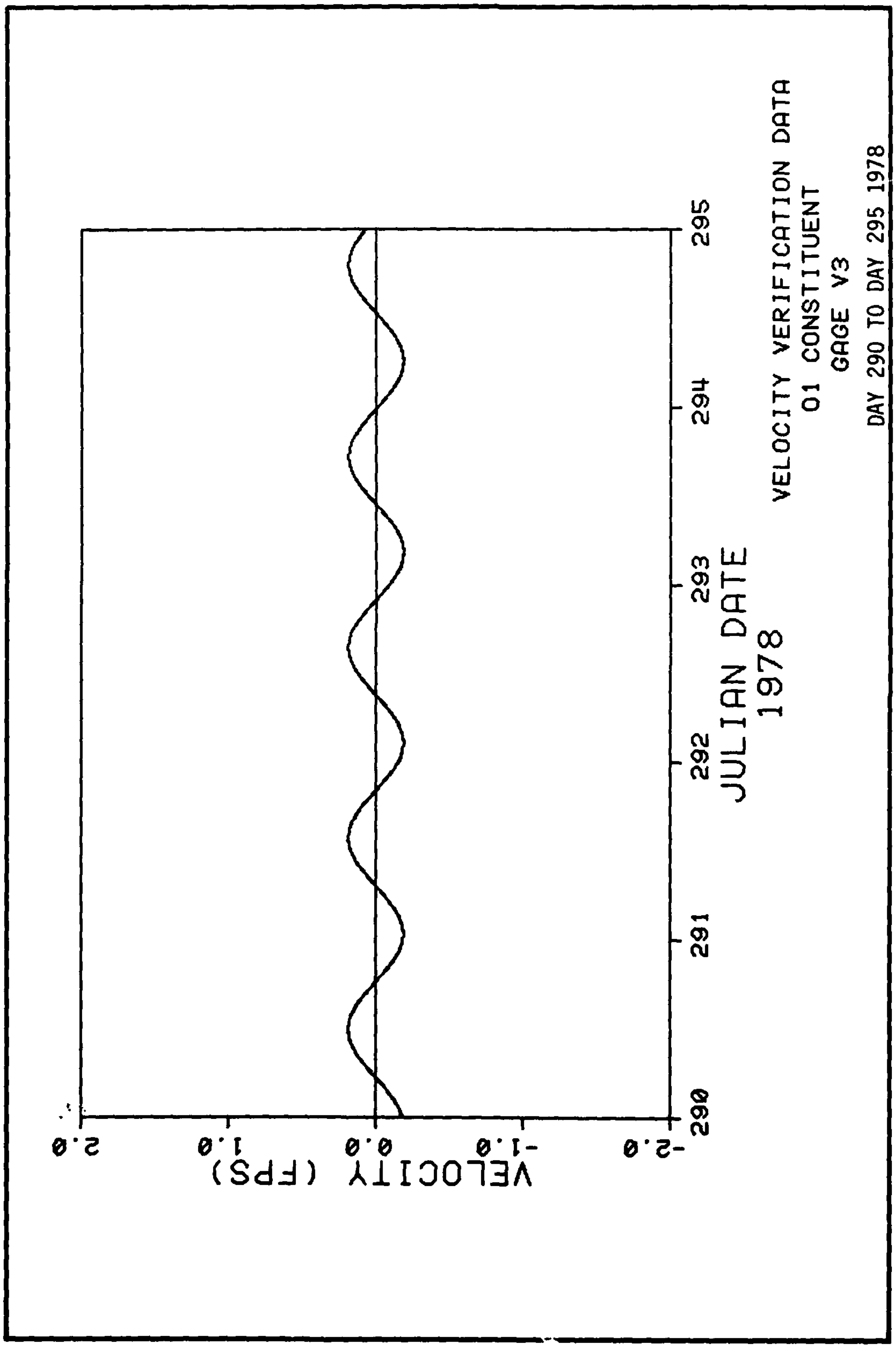

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V3
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E20

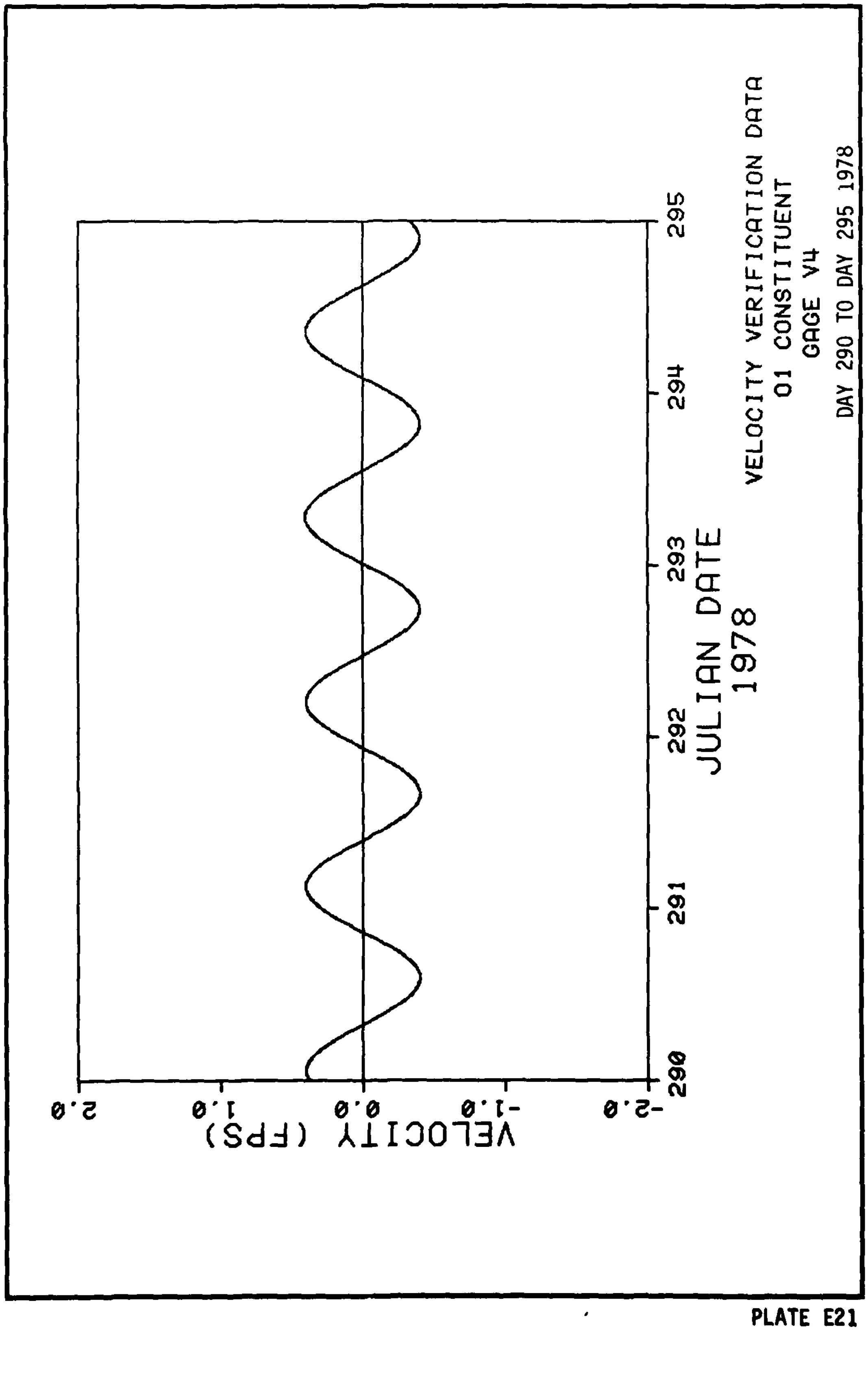
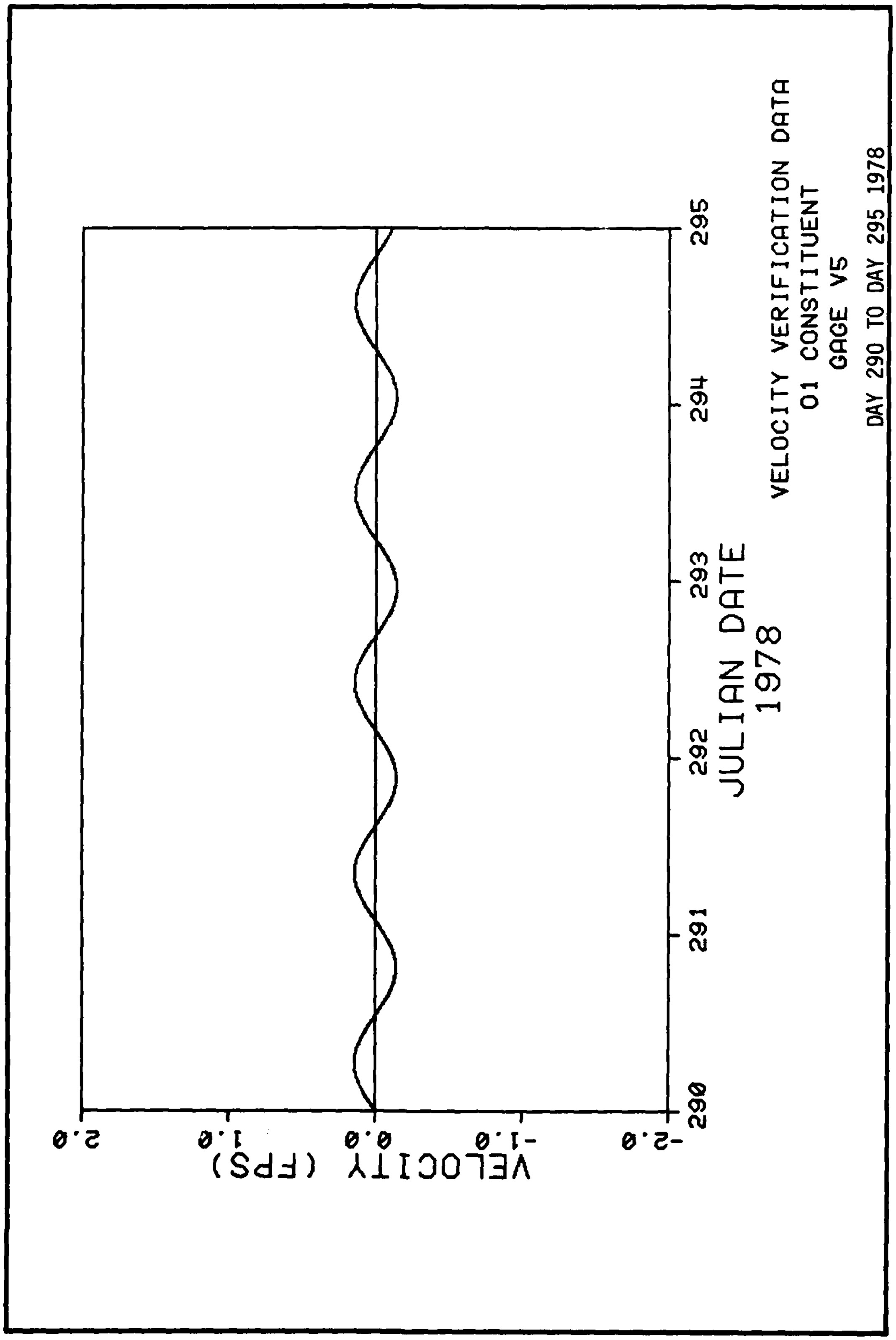

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V4
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E21



VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V5
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E22

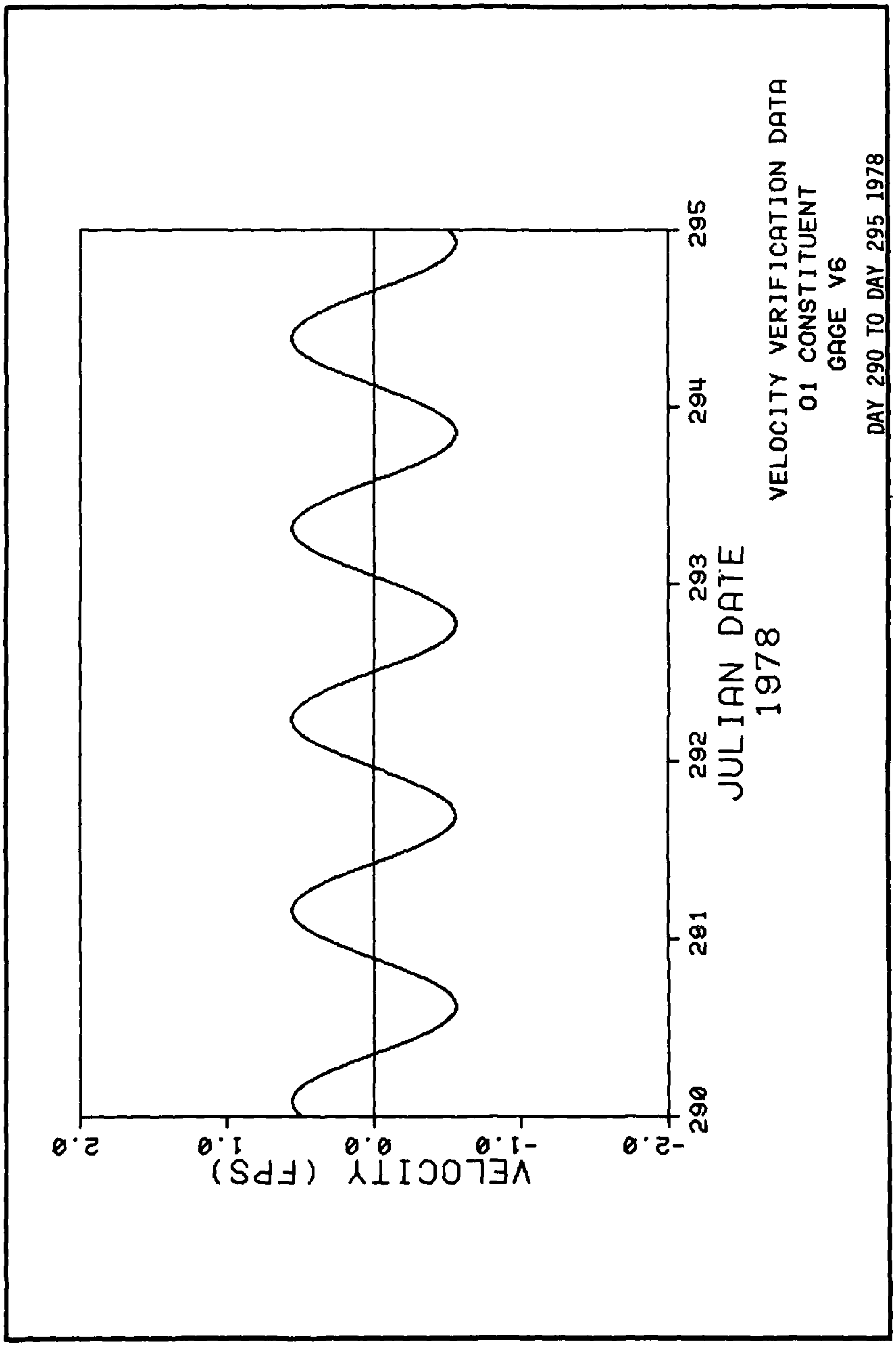
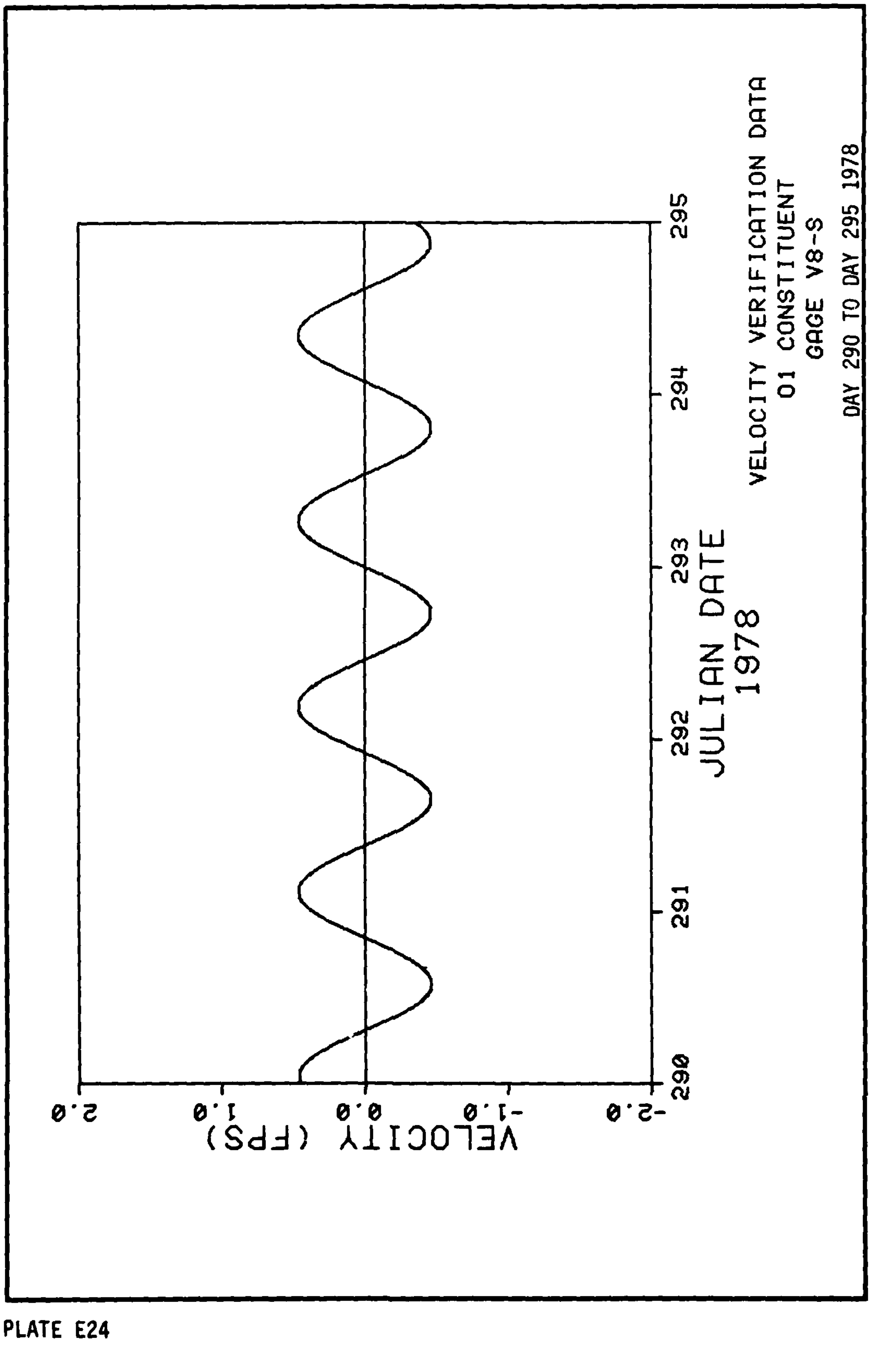

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V6
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
290
291
292
293
294
295
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0

PLATE E23



VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V8-S
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E24

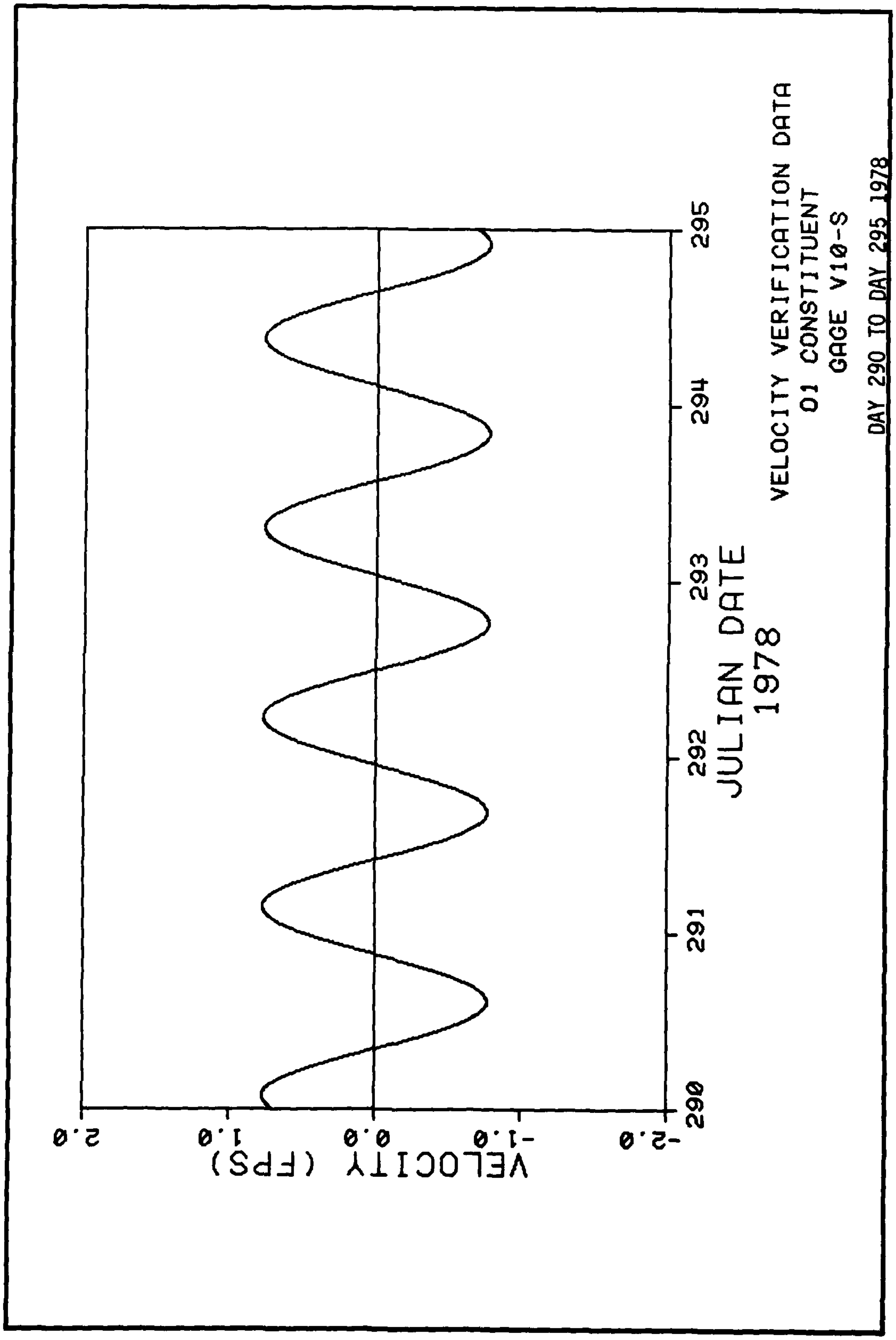

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V10-S
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E25

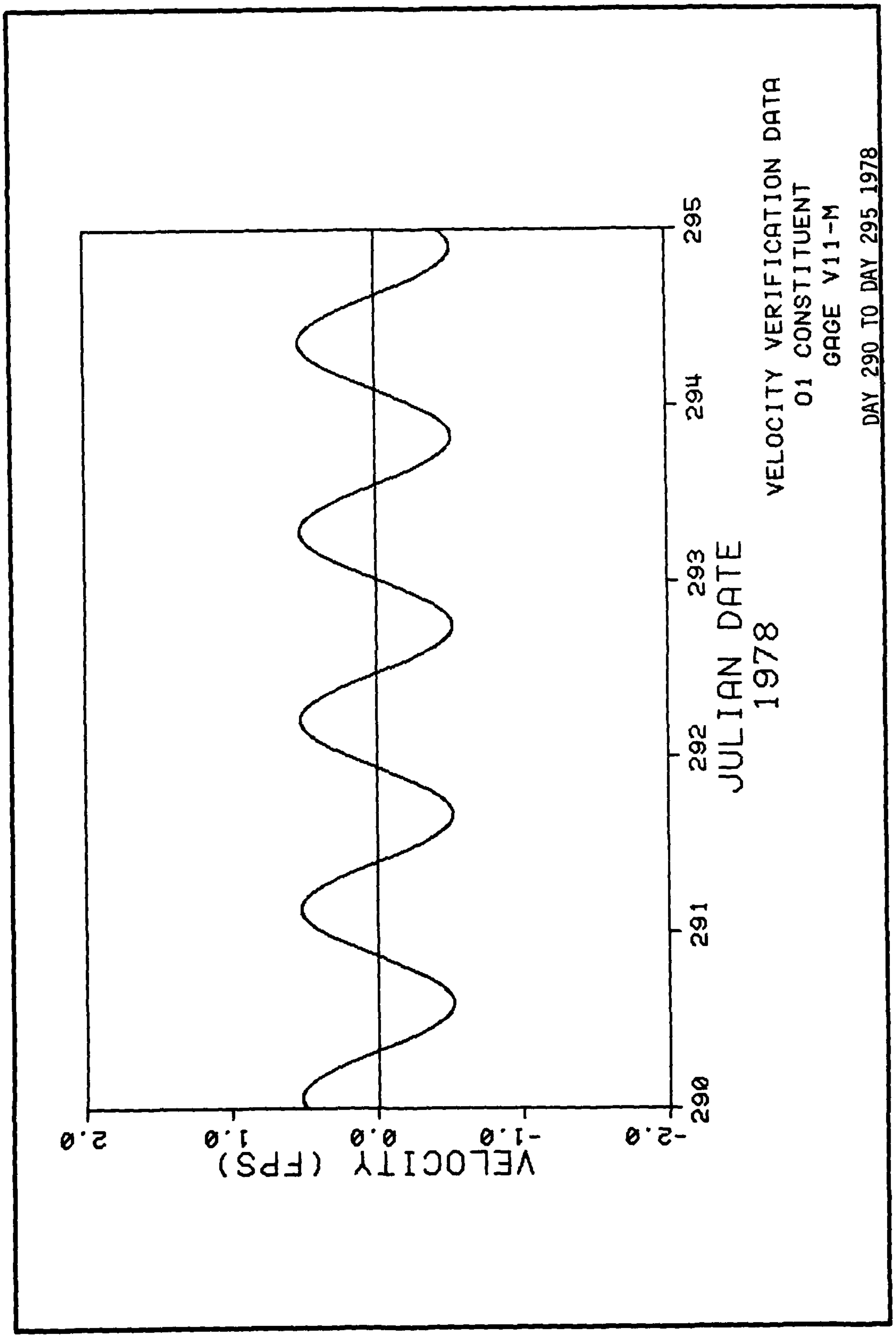
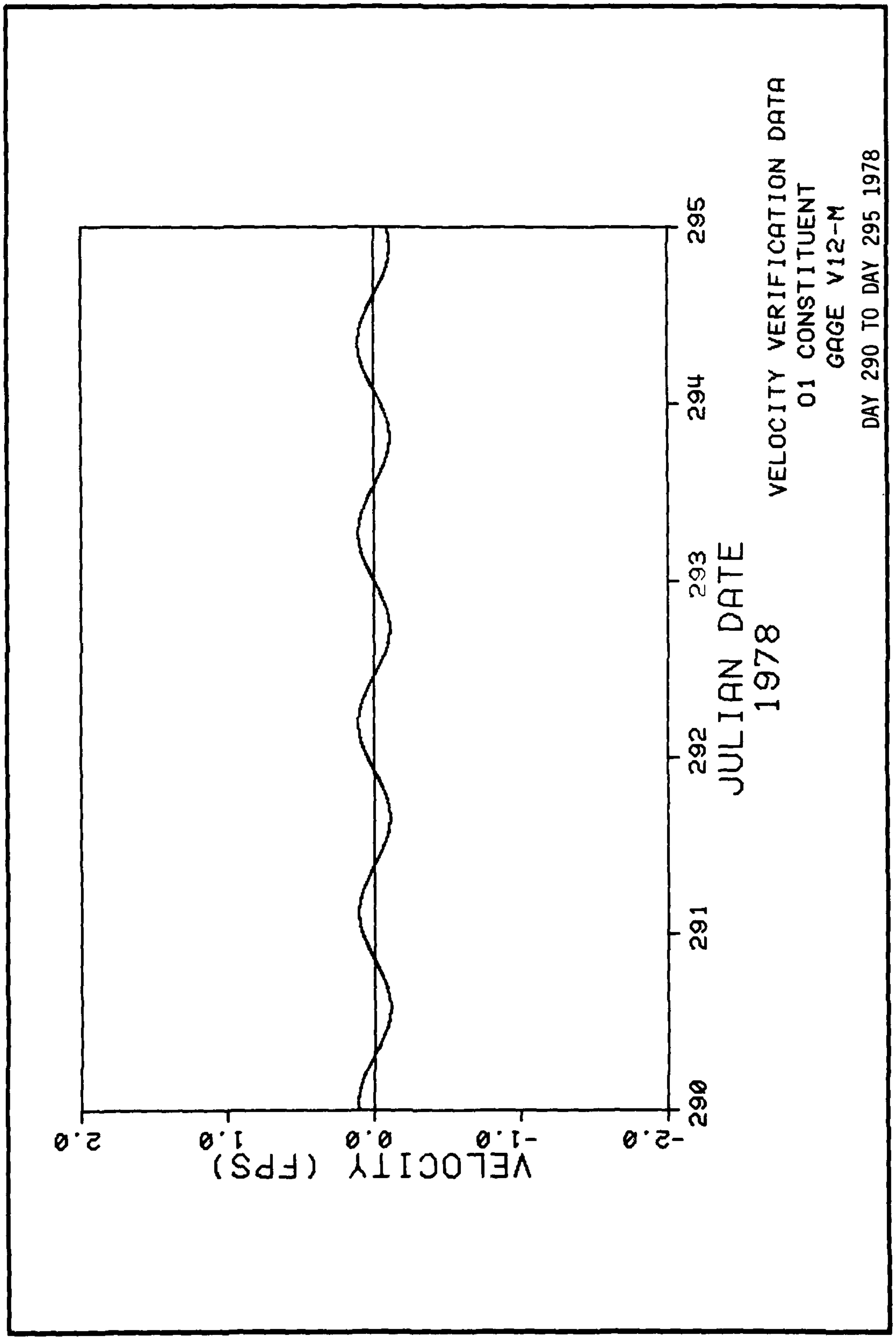

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V11-M
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E26



VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V12-M
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E27

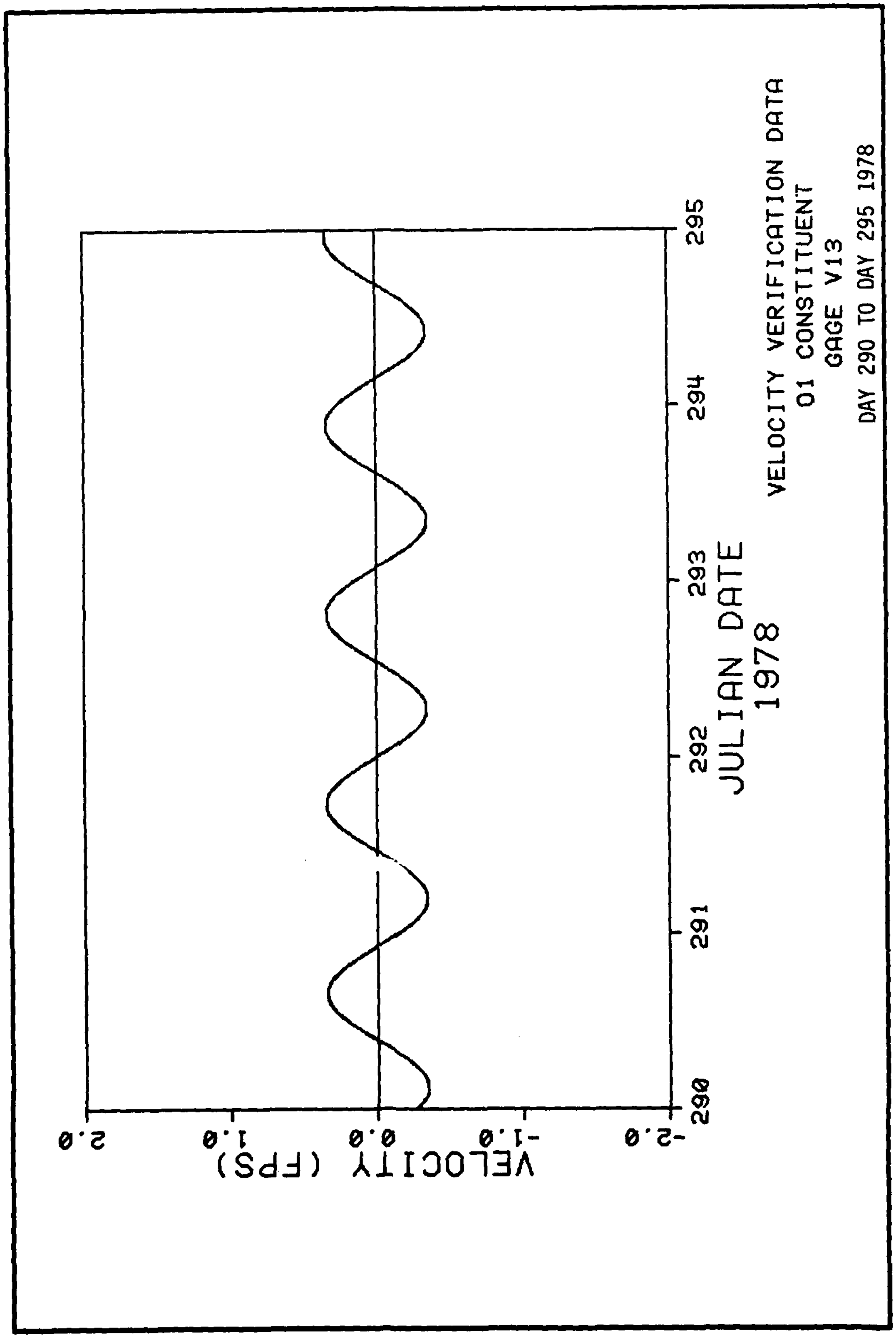

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V13
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E28

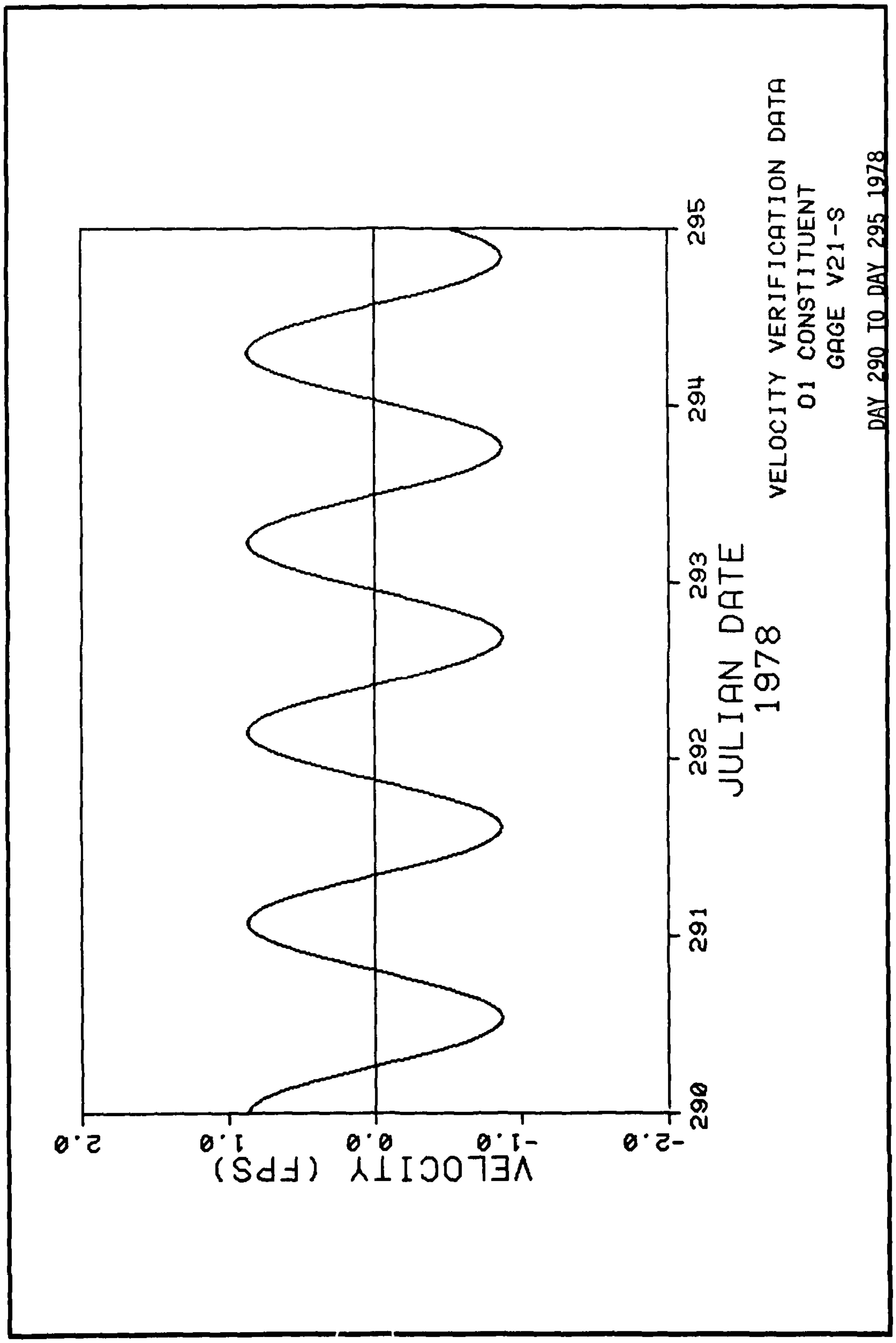
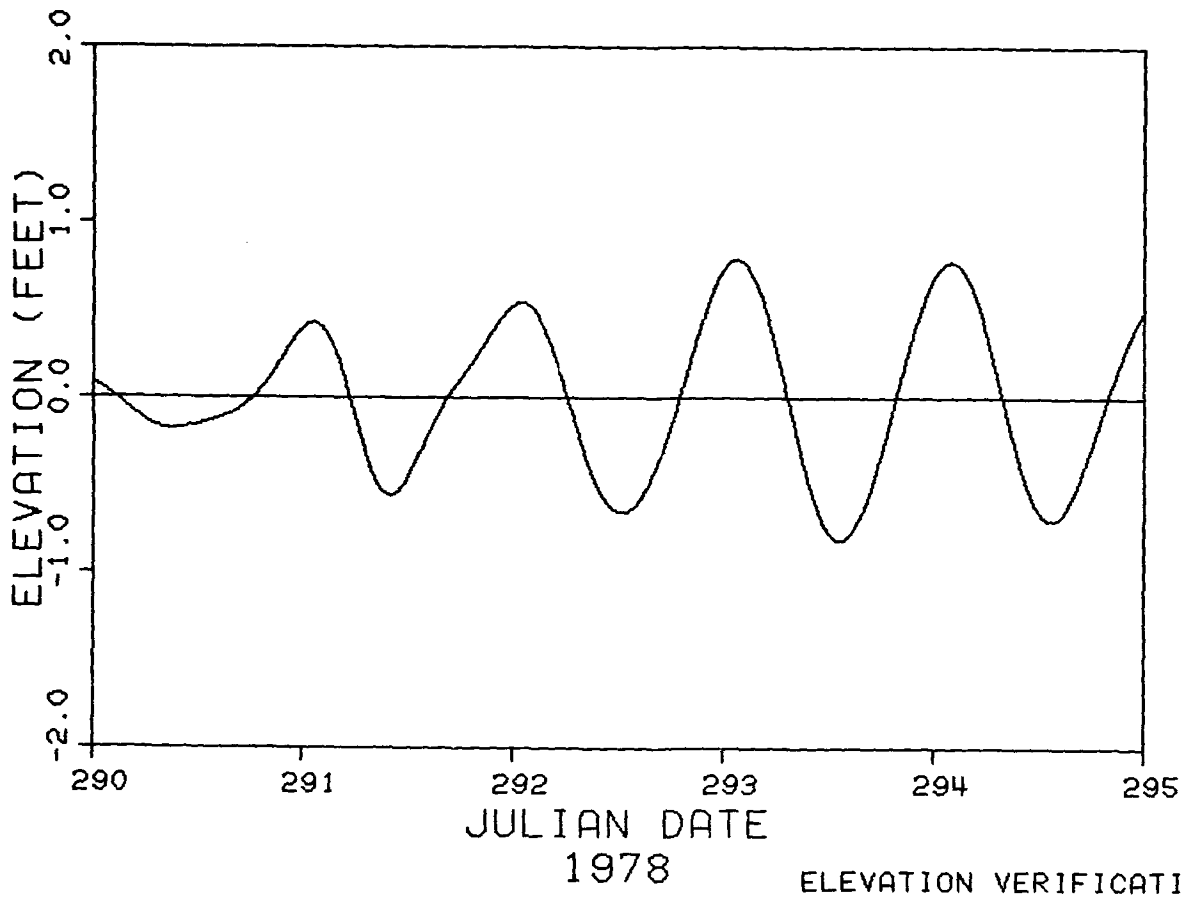

VELOCITY VERIFICATION DATA
O1 CONSTITUENT
GAGE V21-S
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E29



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

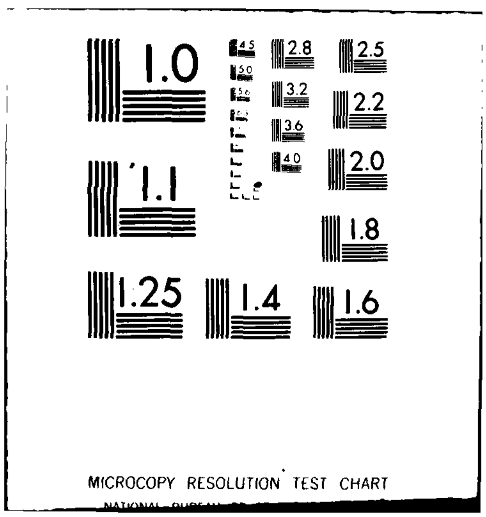
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-2

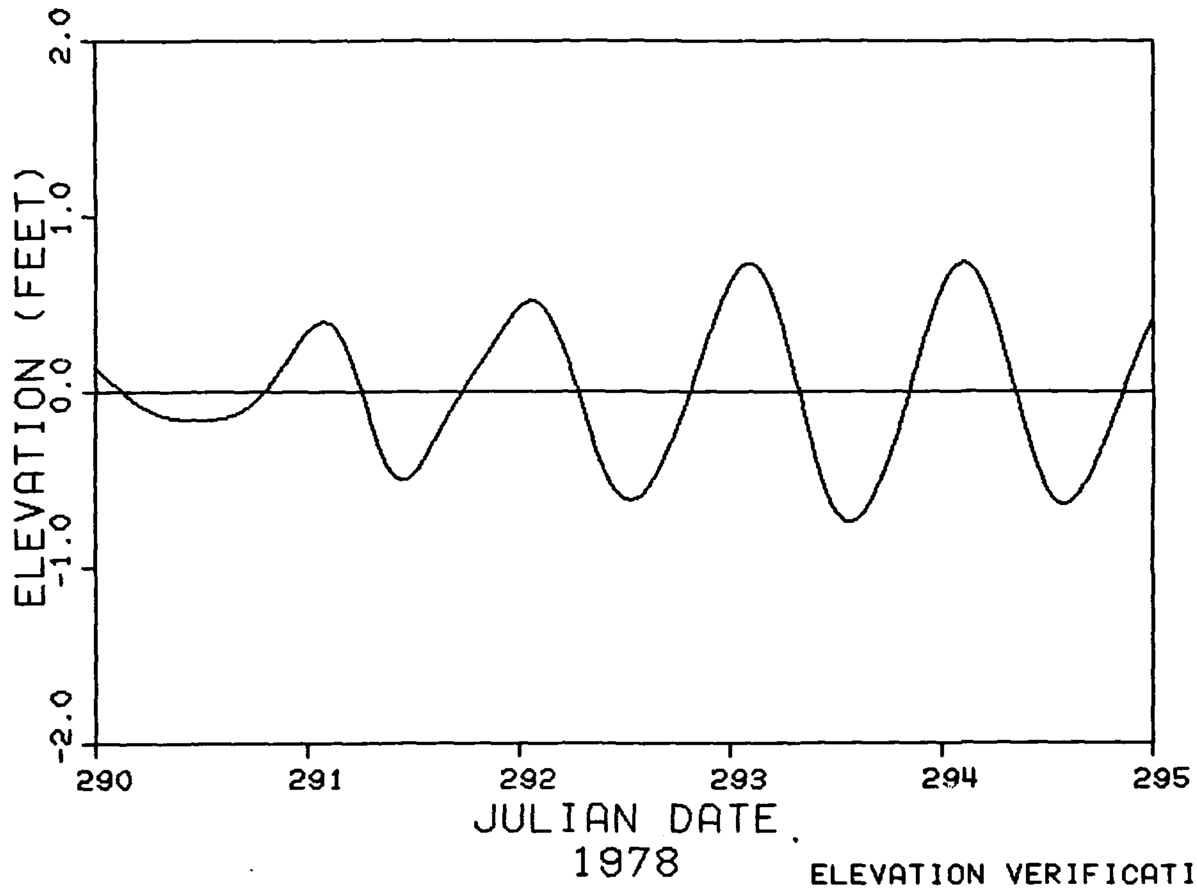
DAY 290 TO DAY 295 1978

PLATE E30

AD-A112 996 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG--ETC F/G 8/8
LAKE PONTCHARTRAIN AND VICINITY HURRICANE PROTECTION PLAN. REPO--ETC(U)
JAN 82 D G OUTLAW
UNCLASSIFIED WES/TR/HL-82-2-1 NL

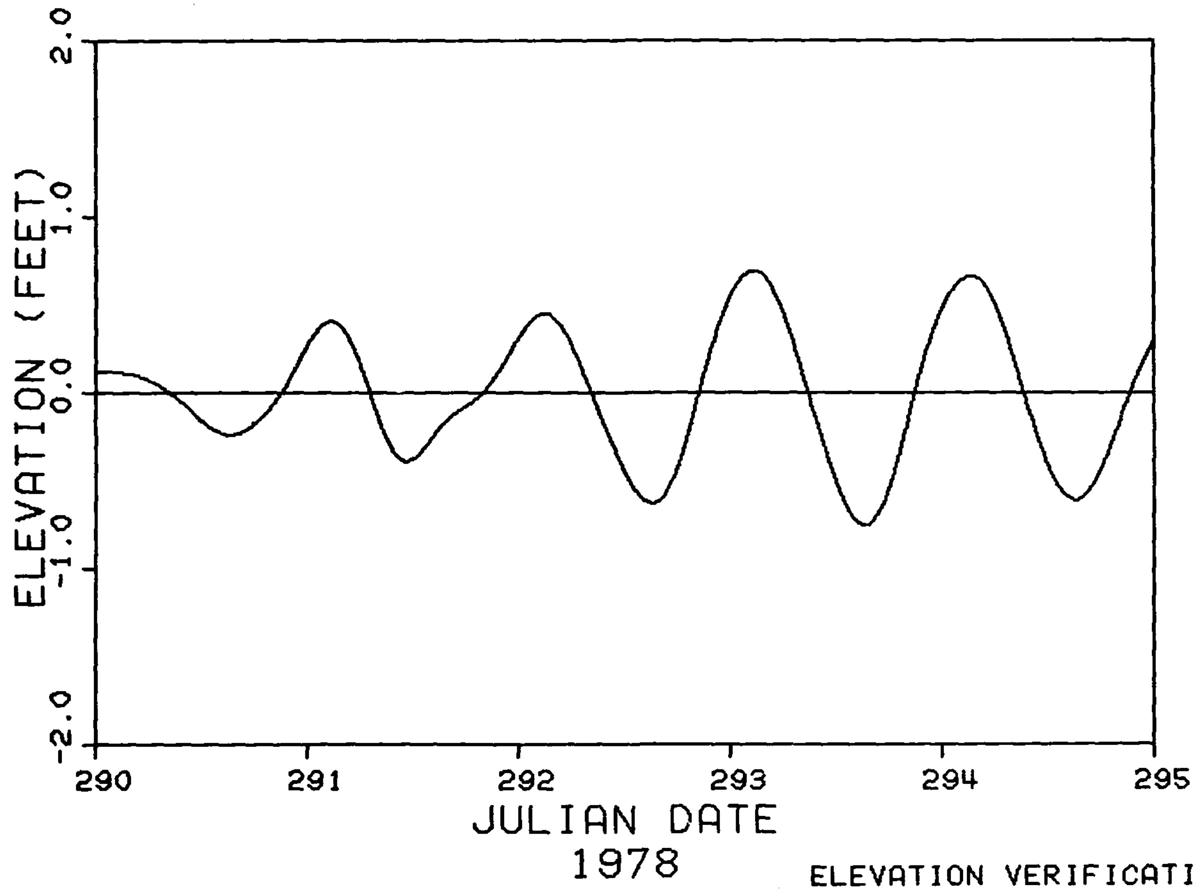
6 OF 7
AD A
112996


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6
MICROCOPY RESOLUTION TEST CHART



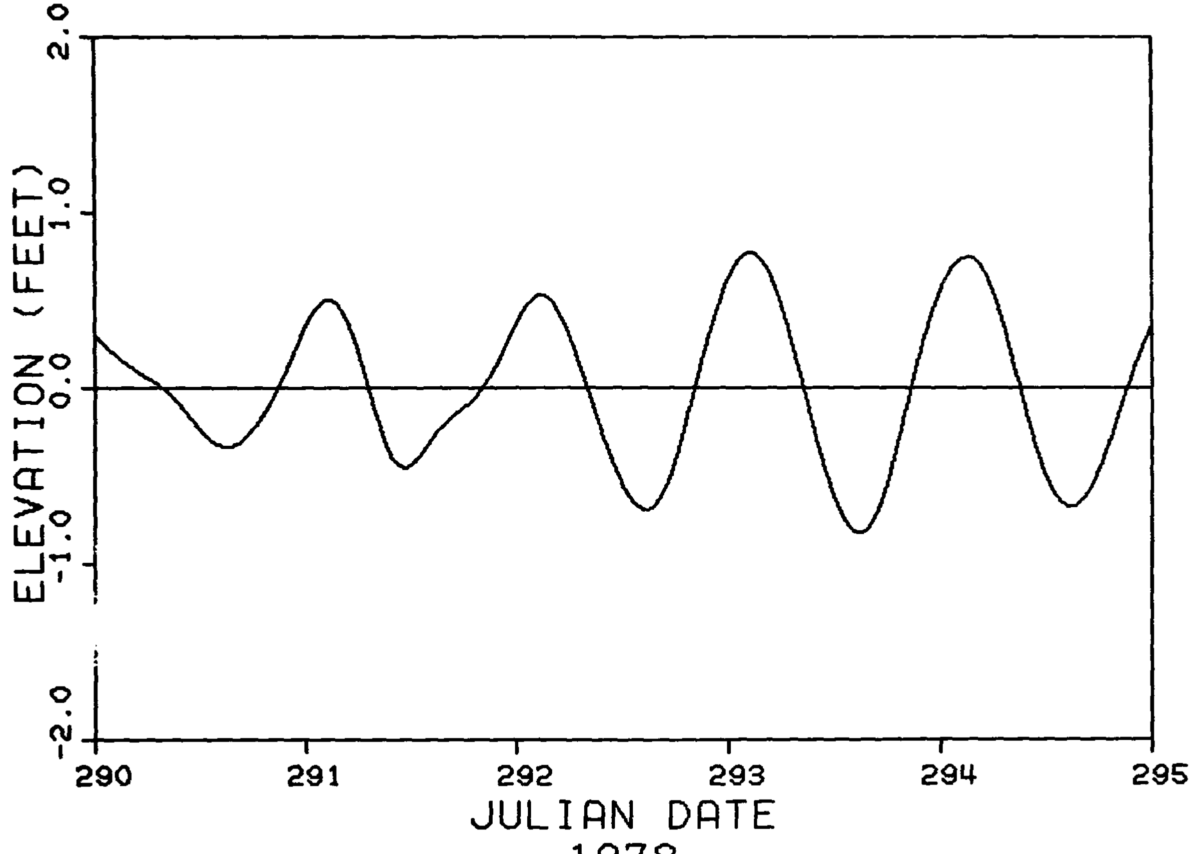
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-3
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-4
DAY 290 TO DAY 295 1978

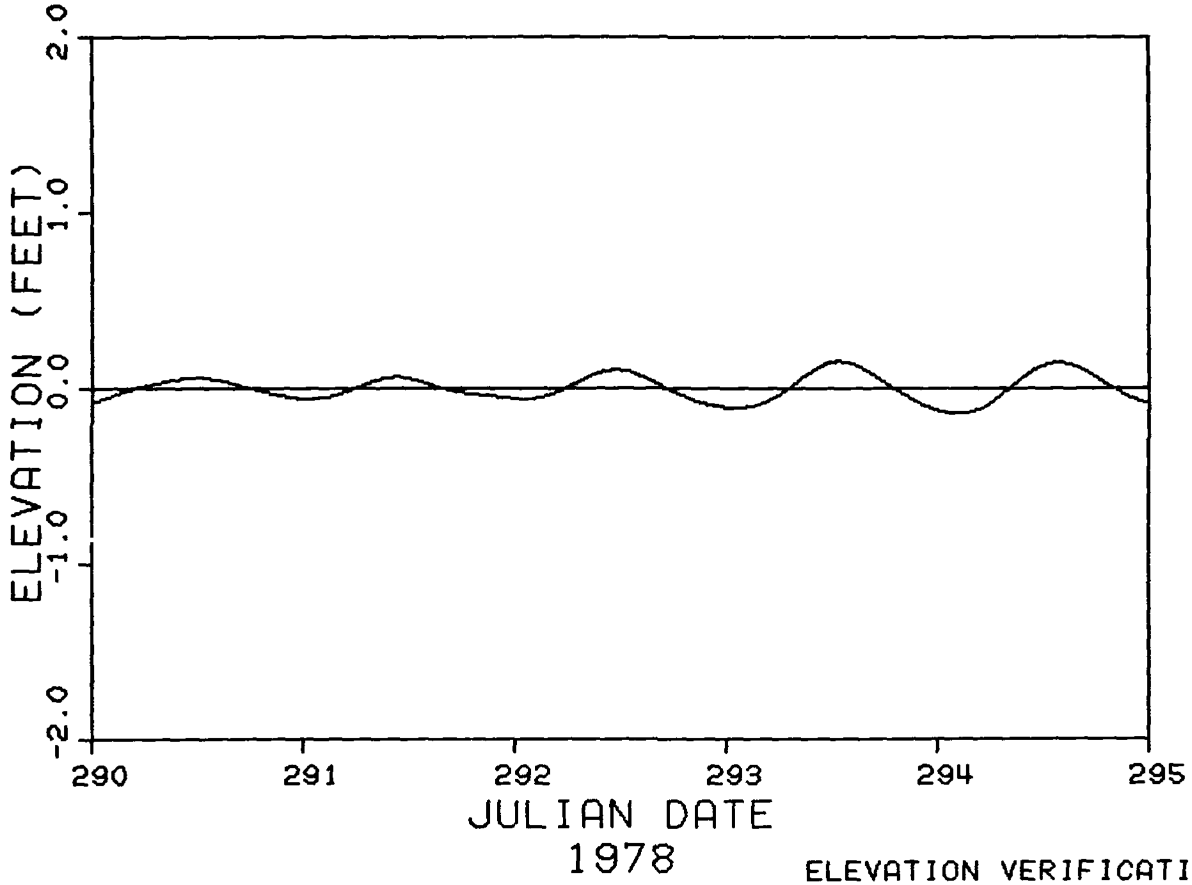
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-6

DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

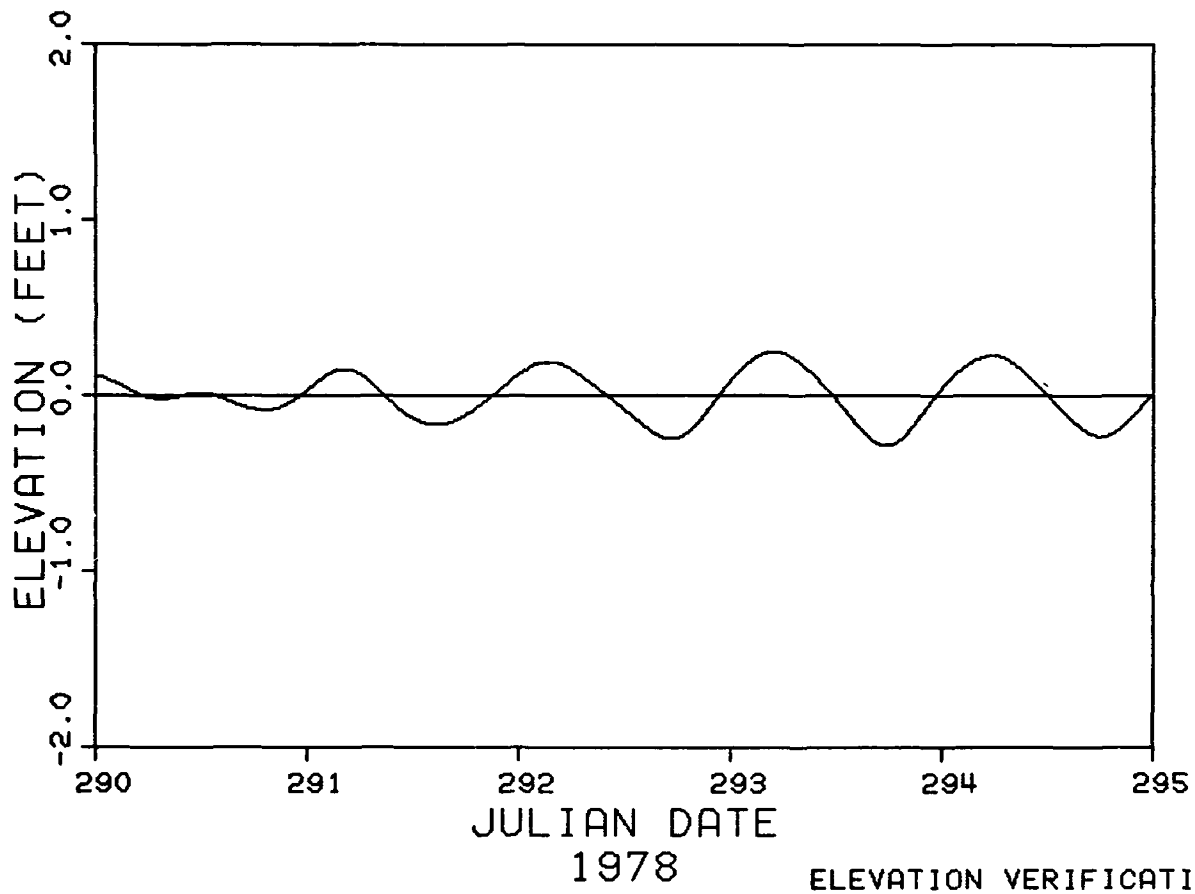


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE M-1

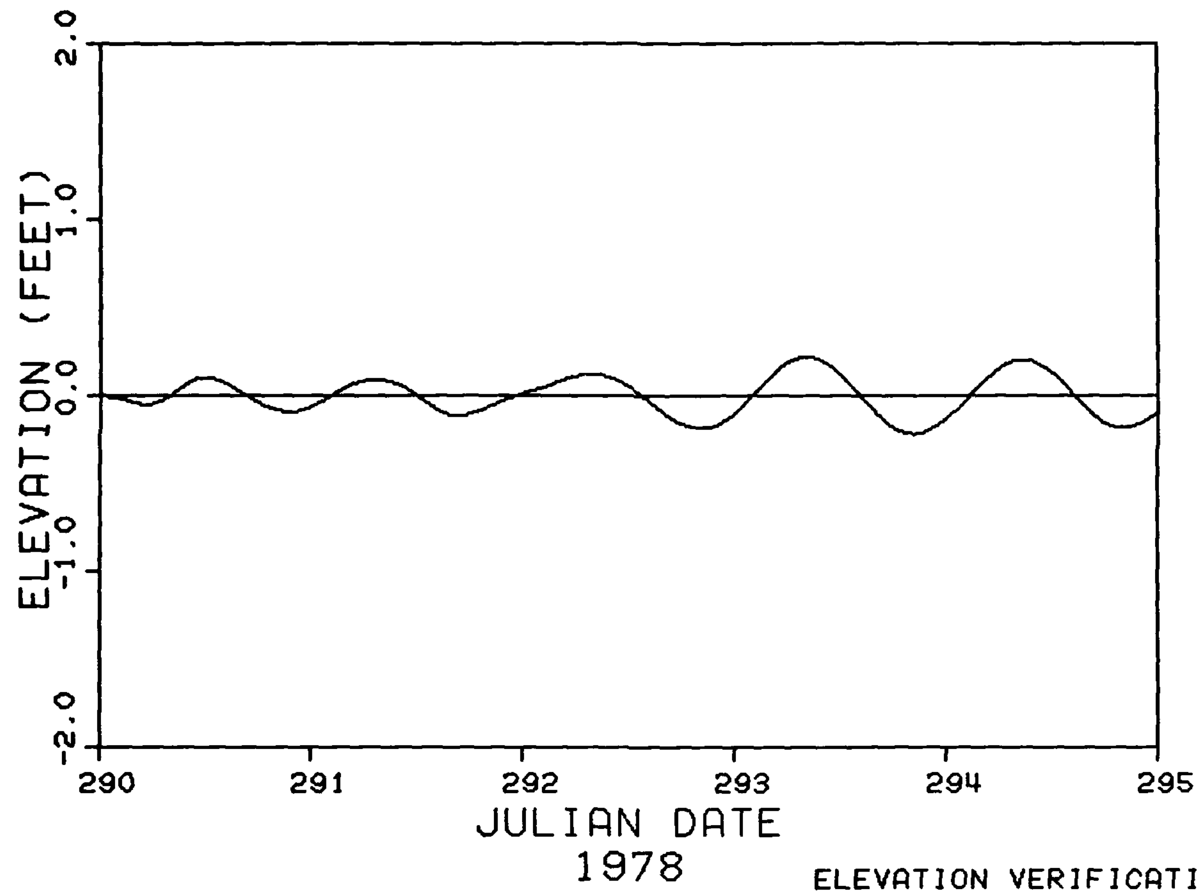
DAY 290 TO DAY 295 1978

PLATE E34



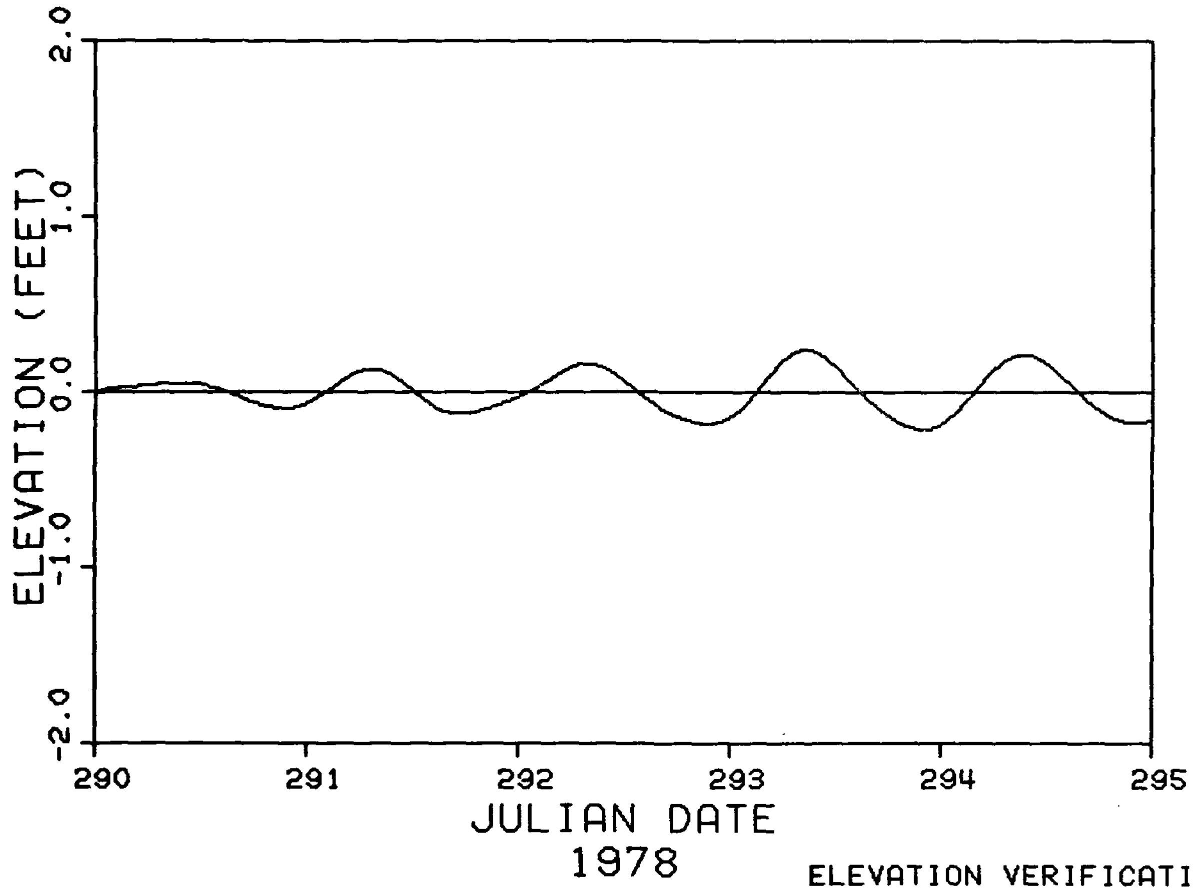
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-1
DAY 290 TO DAY 295 1978



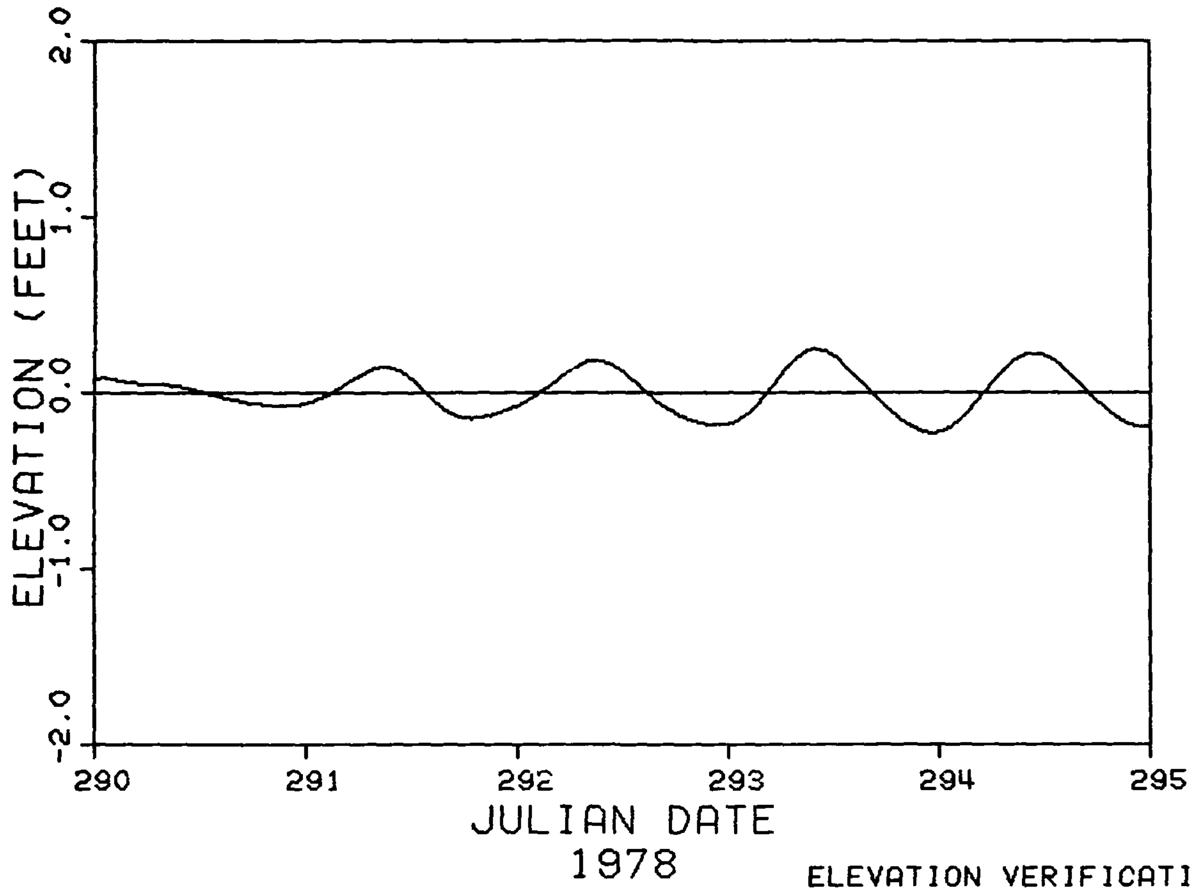
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-2
DAY 290 TO DAY 295 1978



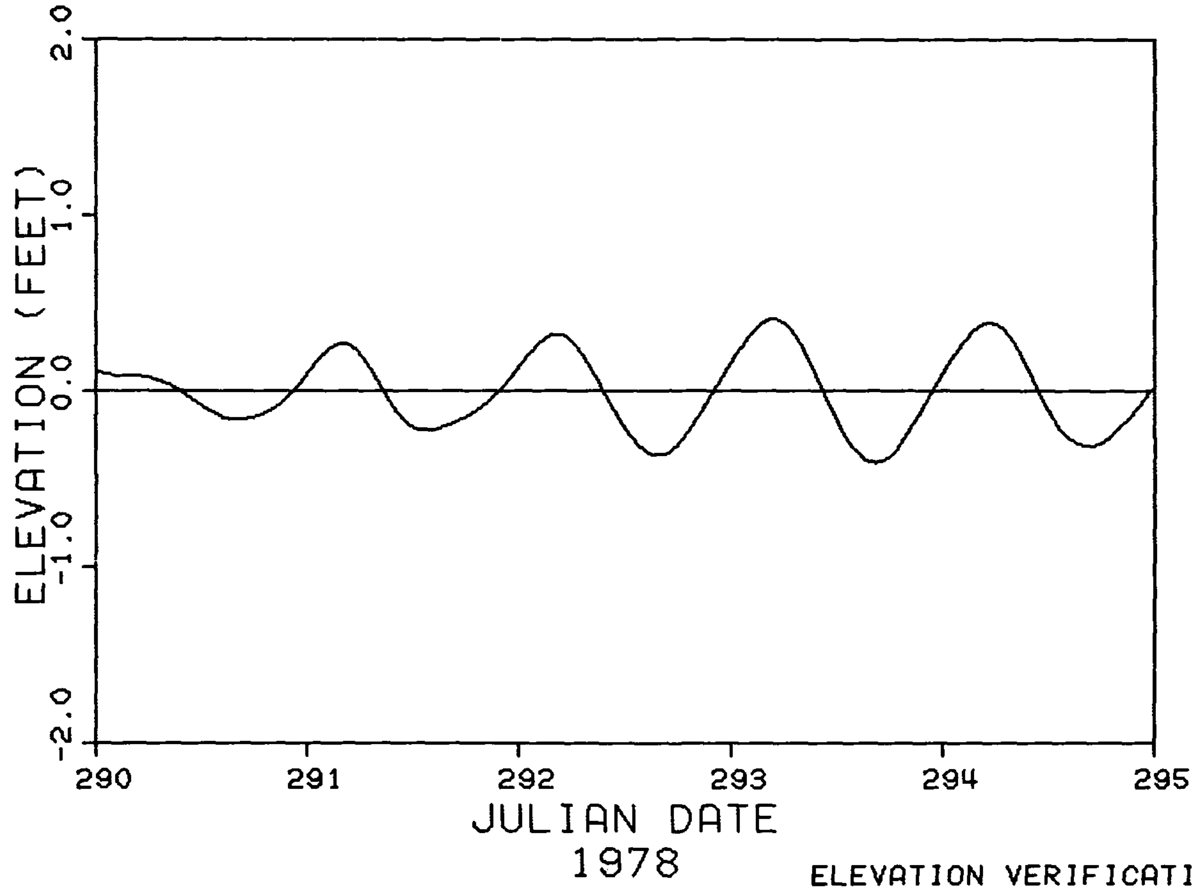
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-4
DAY 290 TO DAY 295 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

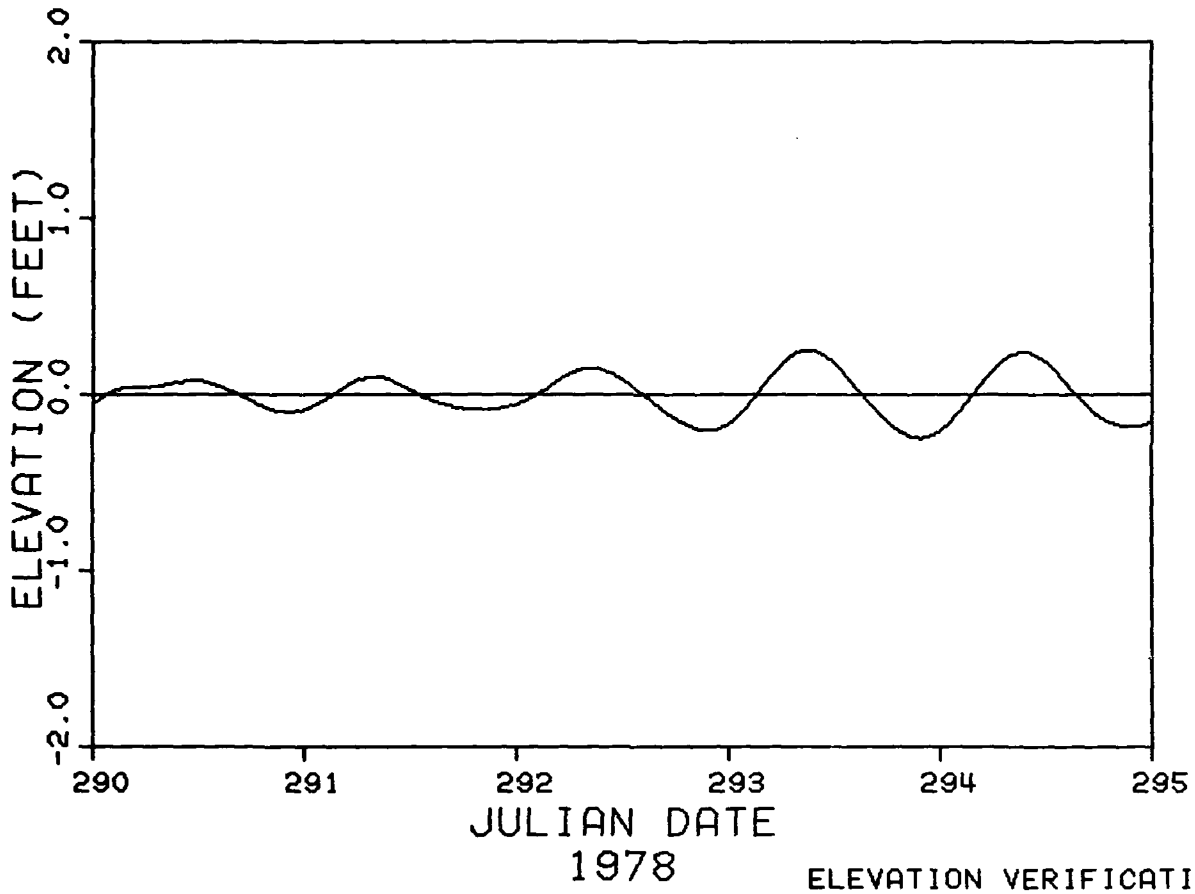
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-5
DAY 290 TO DAY 295 1978



ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-6

DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

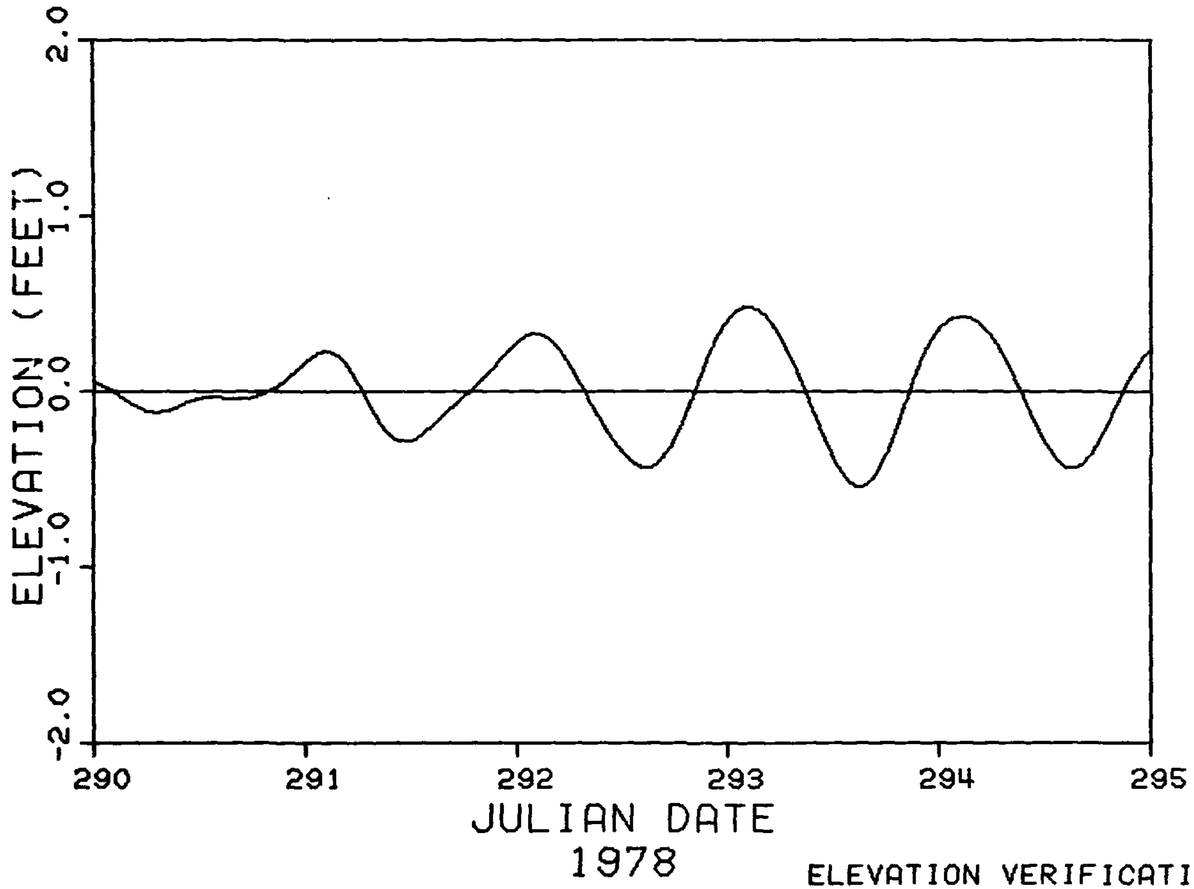


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-7

DAY 290 TO DAY 295 1978

PLATE E40



ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE R-1

DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

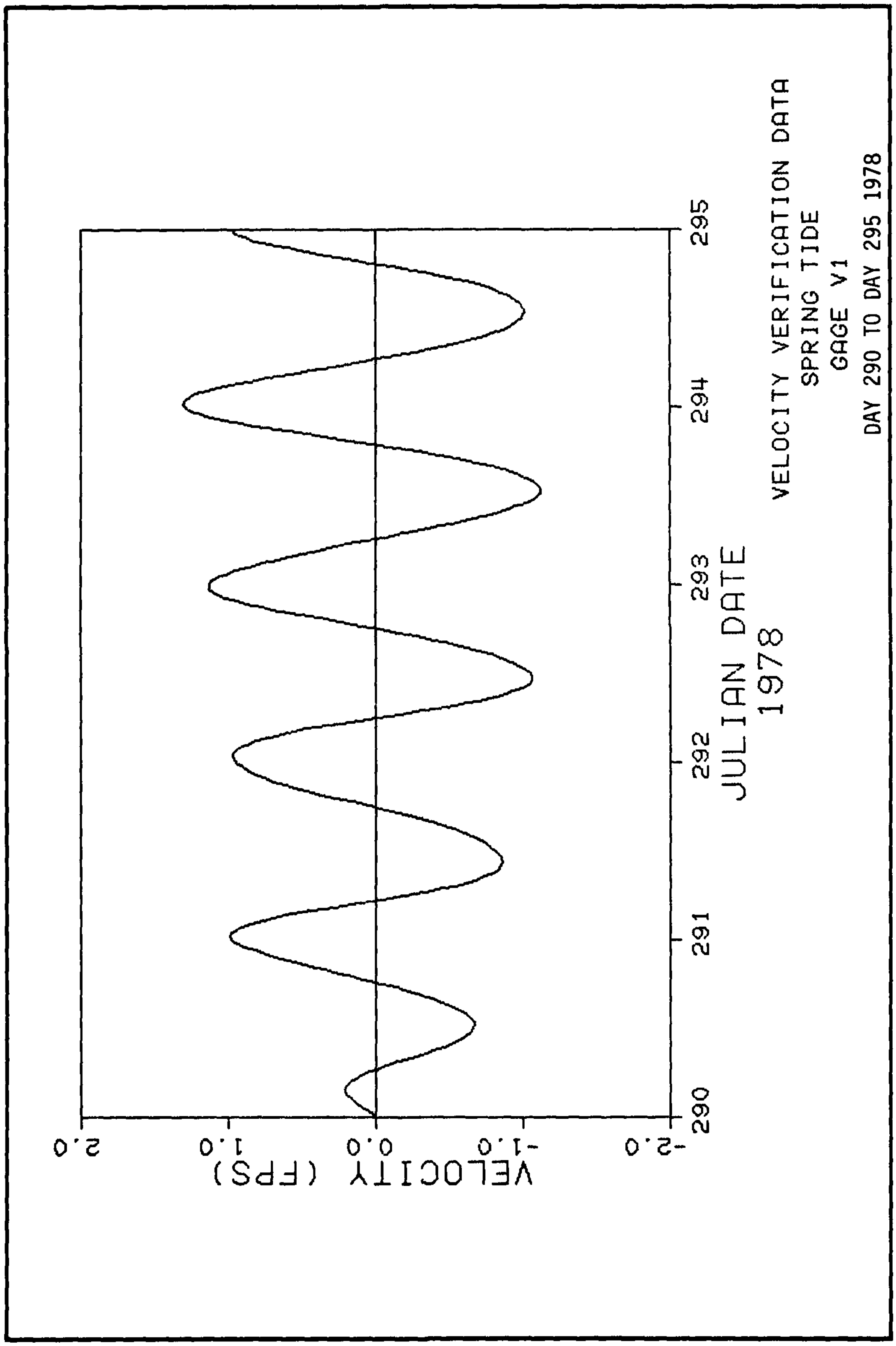
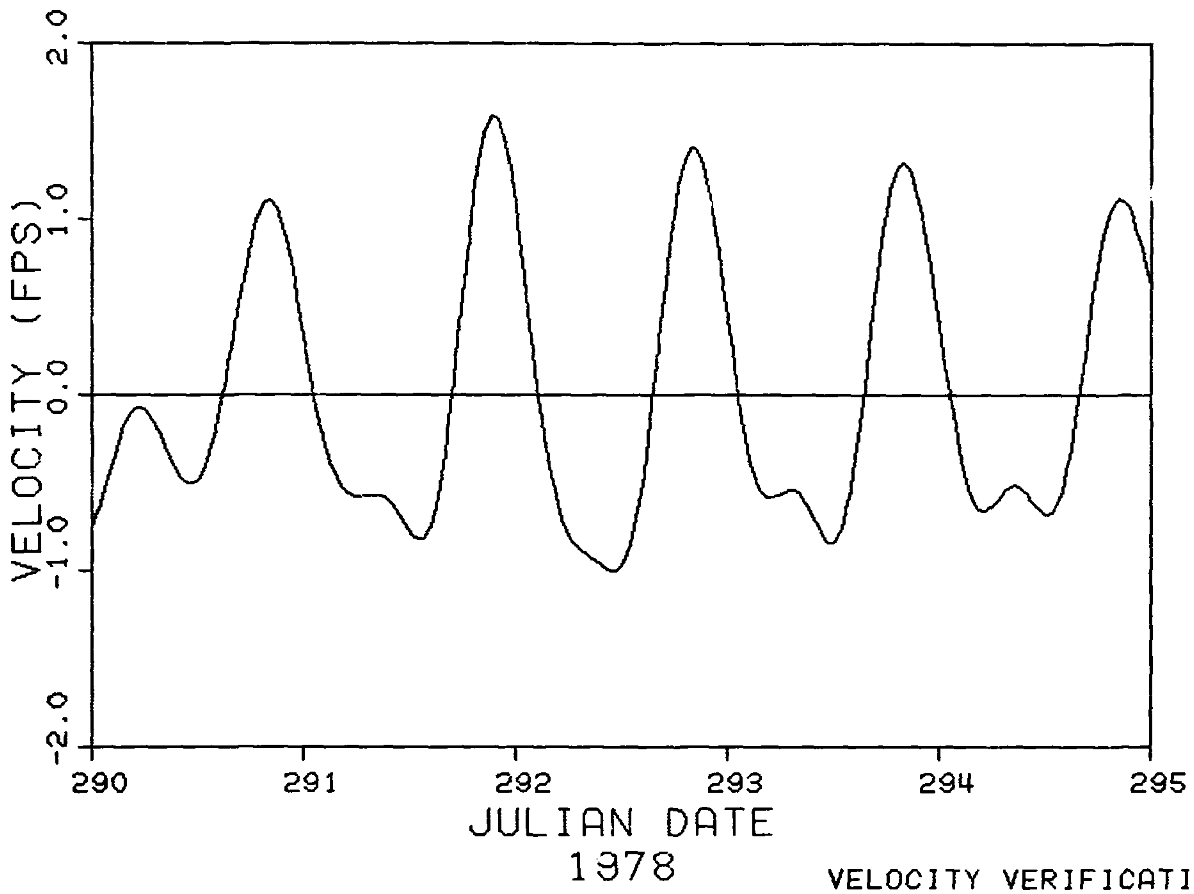

VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V1
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
290
291
292
293
294
295
-2.0
-1.0
0.0
1.0
2.0

PLATE E42



VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V2
DAY 290 TO DAY 295 1978

PLATE E43

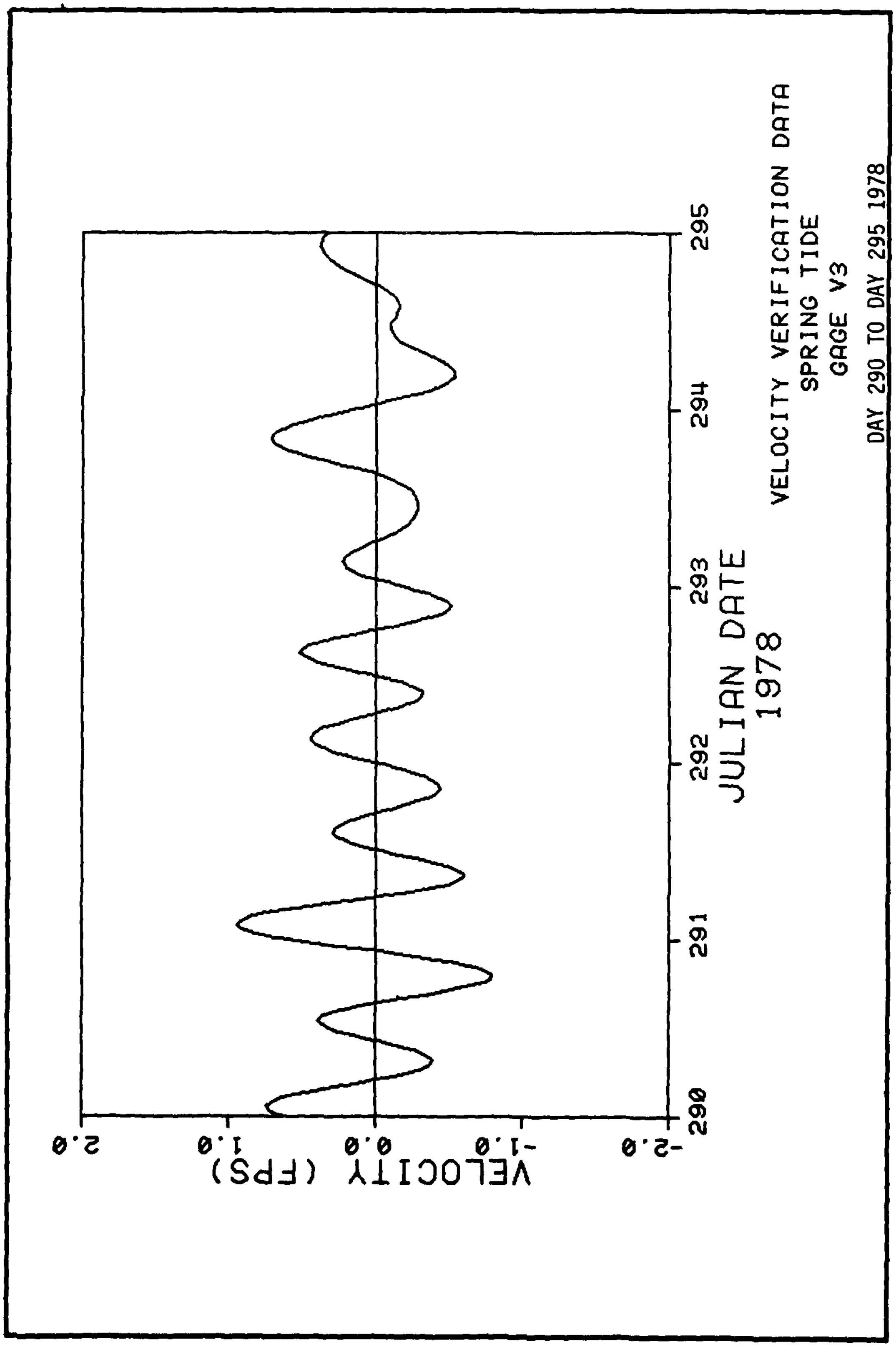
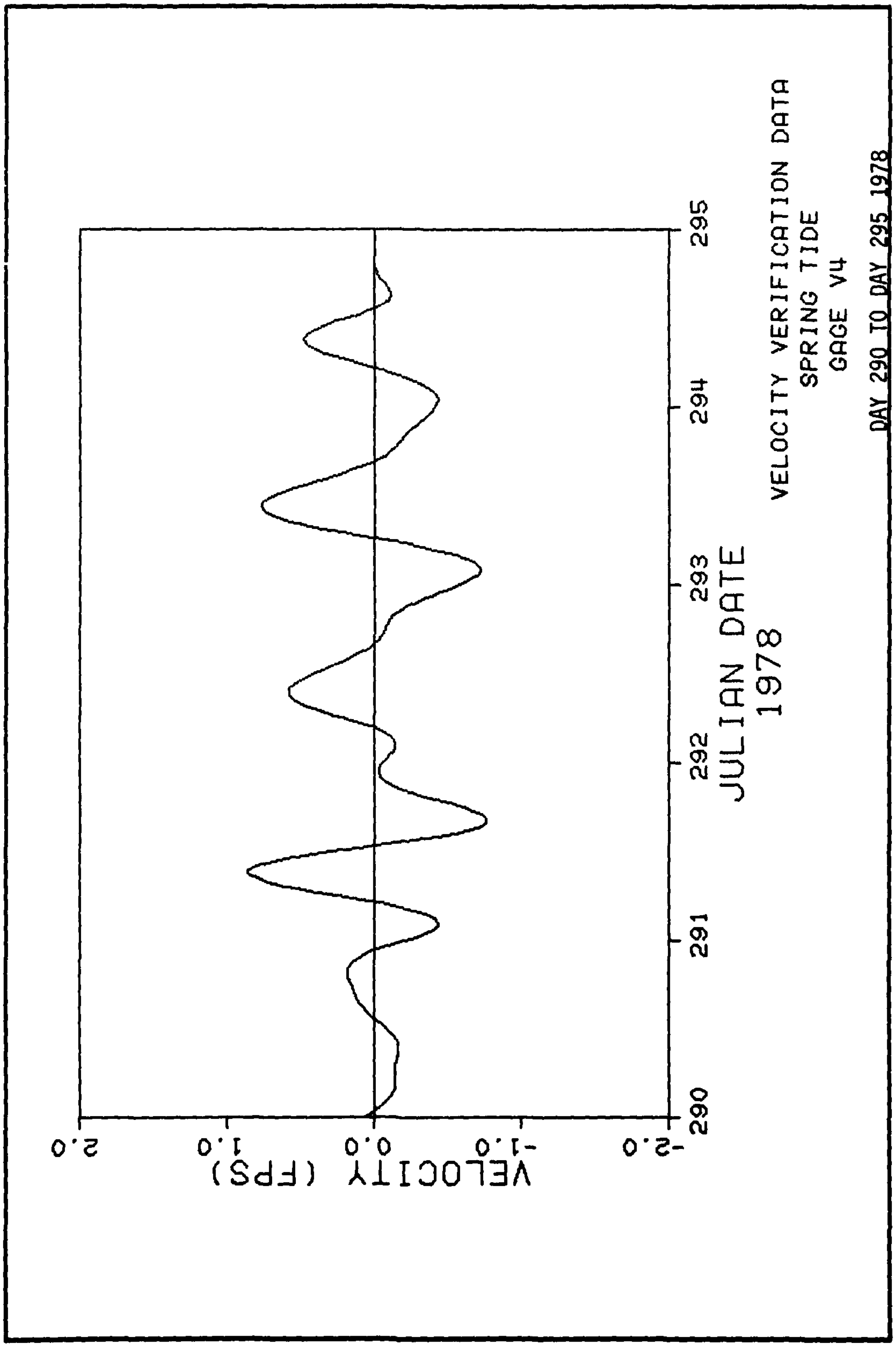

VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V3
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E44



VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V4
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E45

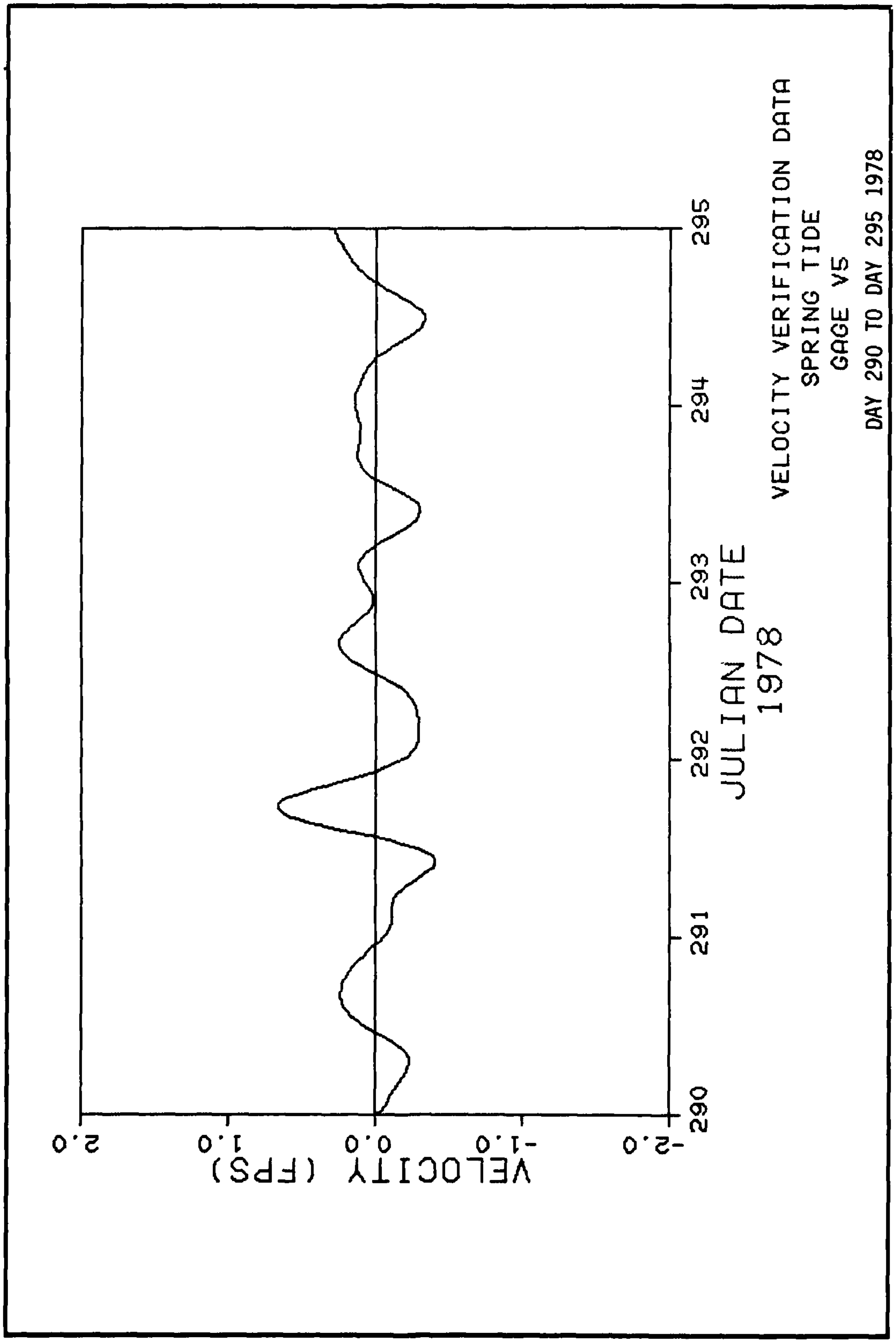
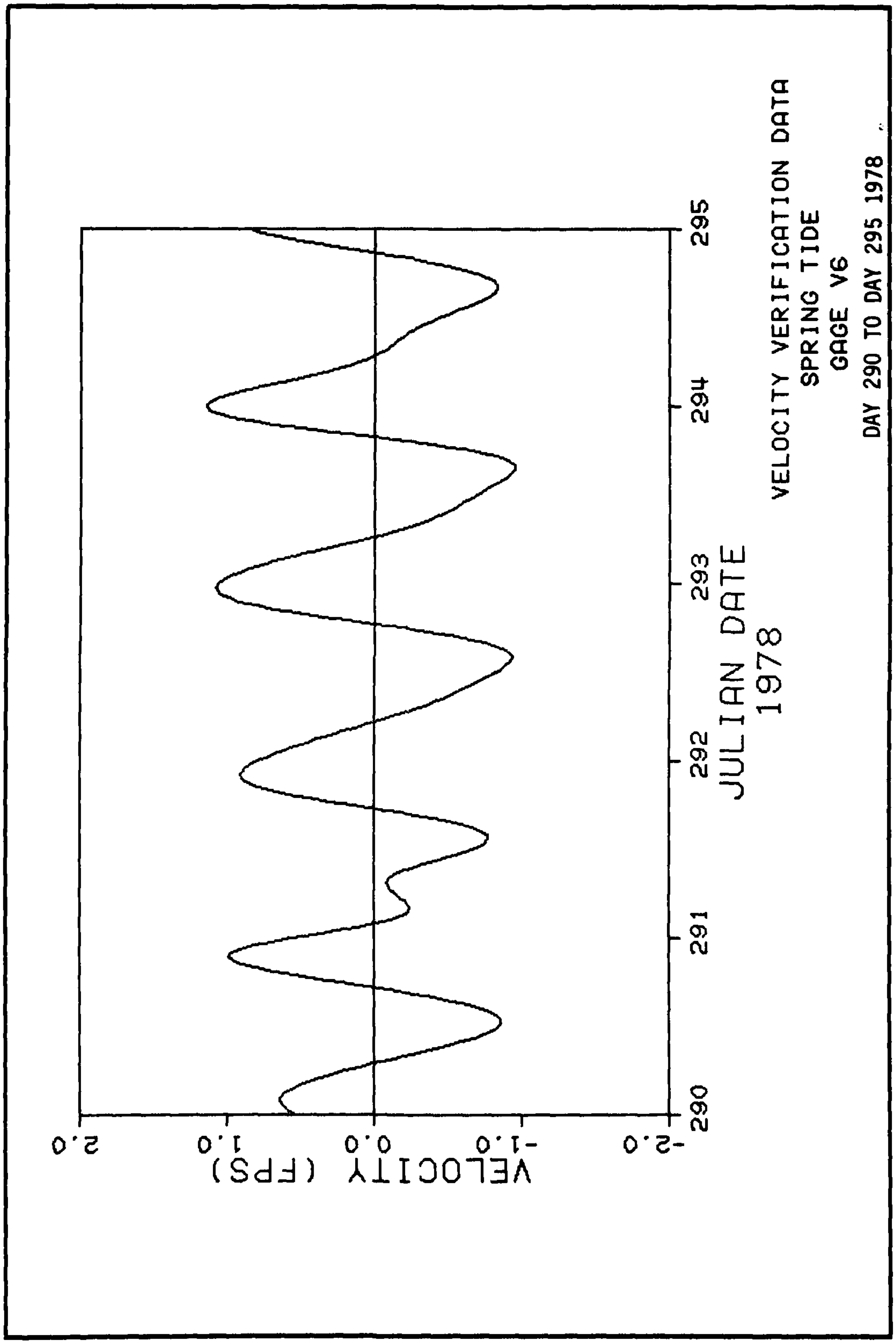

VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V5
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
290
291
292
293
294
295
VELOCITY (FPS)
-2.0
-1.0
0.0
1.0
2.0

PLATE E46



VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V6
DAY 290 TO DAY 295 1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295
JULIAN DATE
1978

PLATE E47

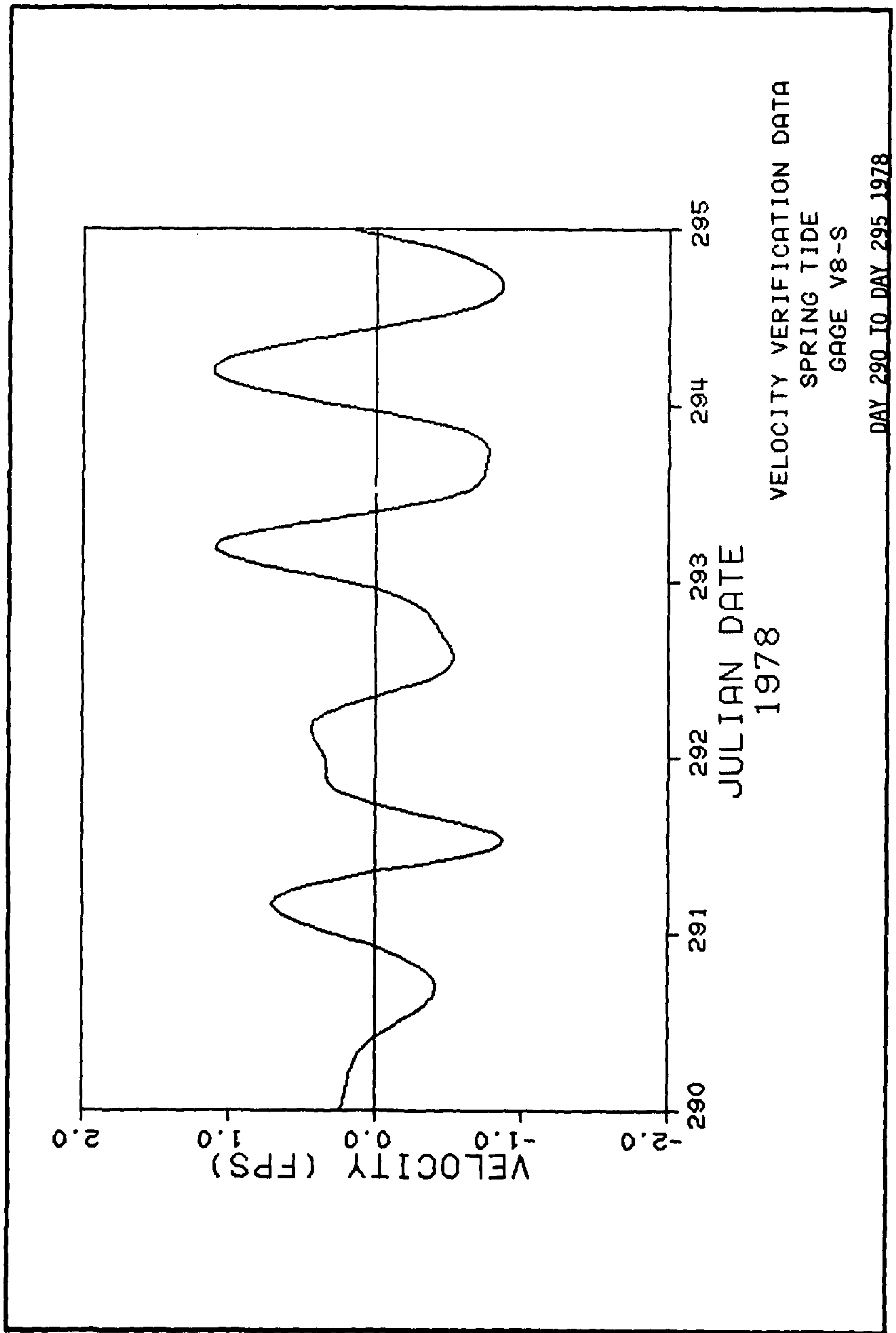
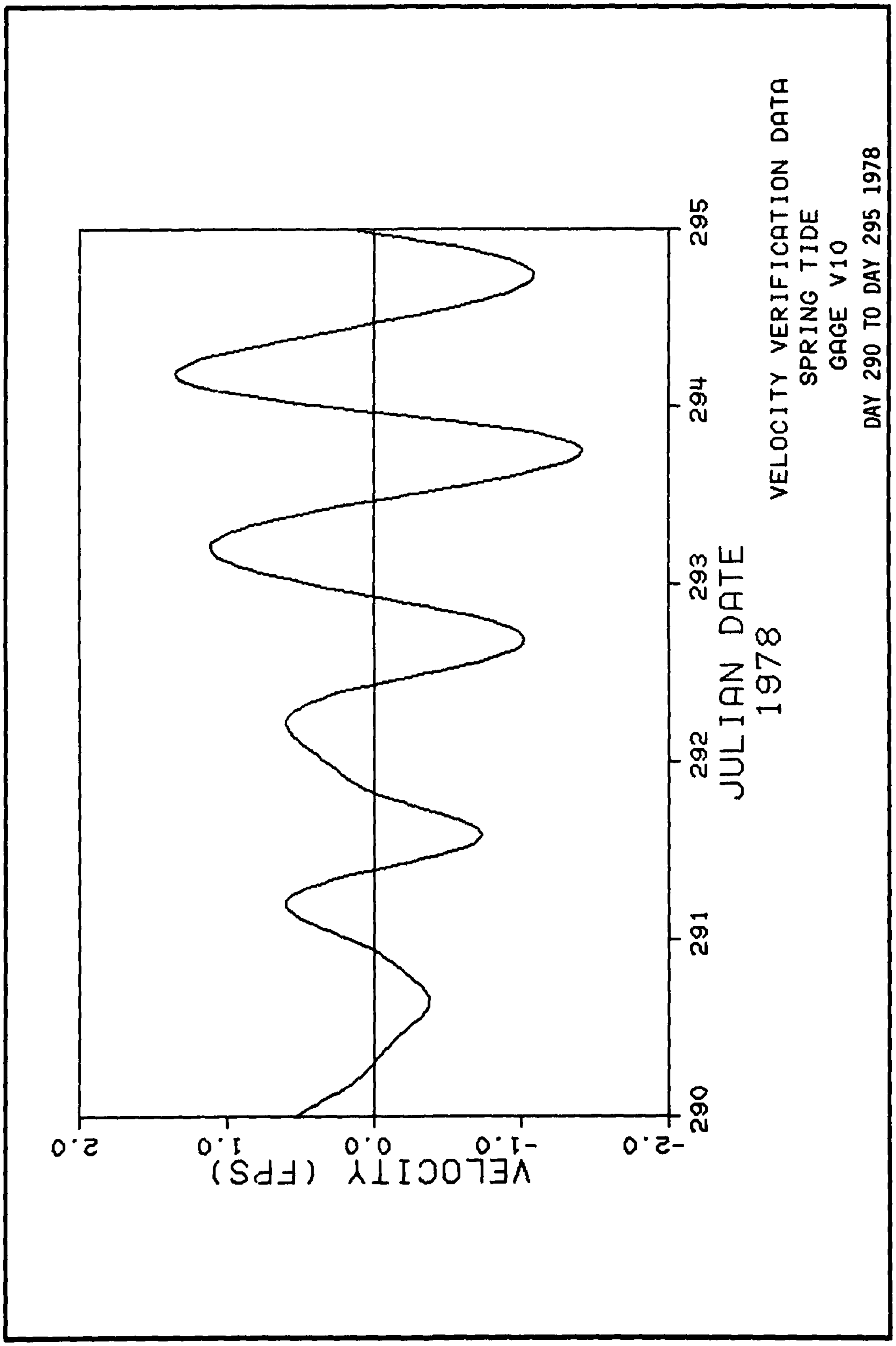

VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V8-S
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E48



VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V10
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
290
291
292
293
294
295
-2.0
-1.0
0.0
1.0
2.0

PLATE E49

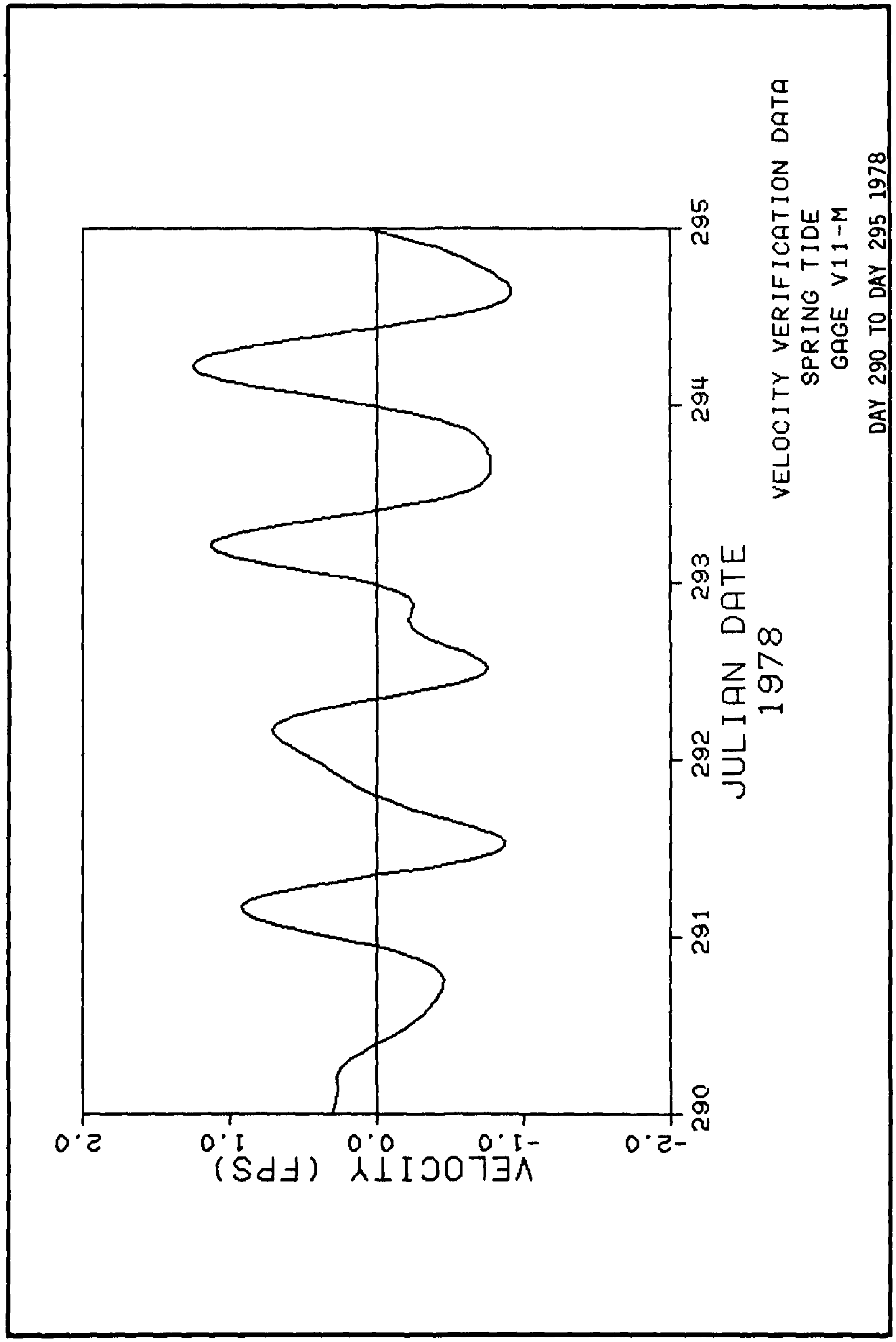

VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V11-M
DAY 290 TO DAY 295 1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295
JULIAN DATE
1978

PLATE E50

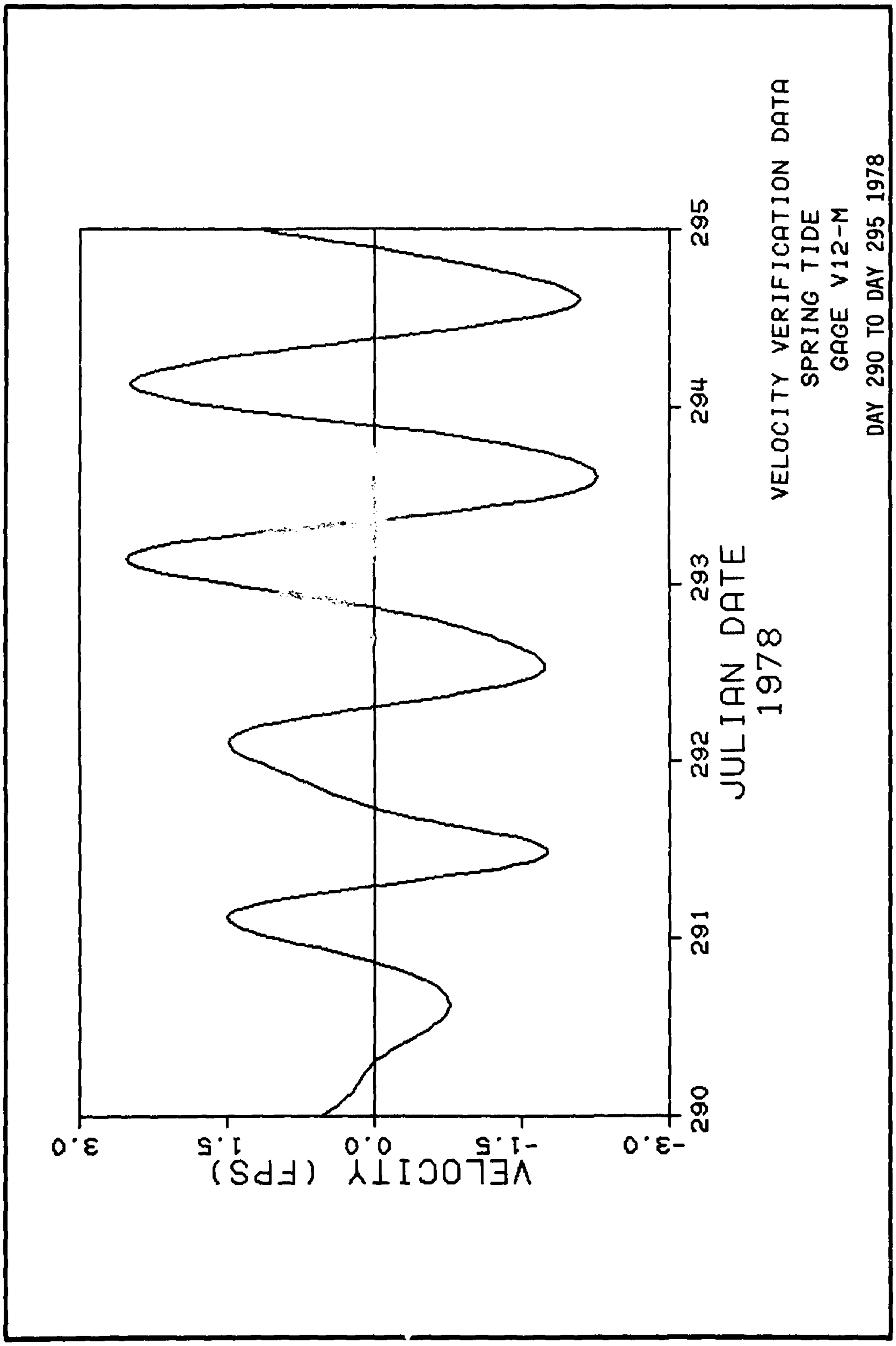

VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V12-M
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
3.0
1.5
0.0
-1.5
-3.0
290
291
292
293
294
295

PLATE E51

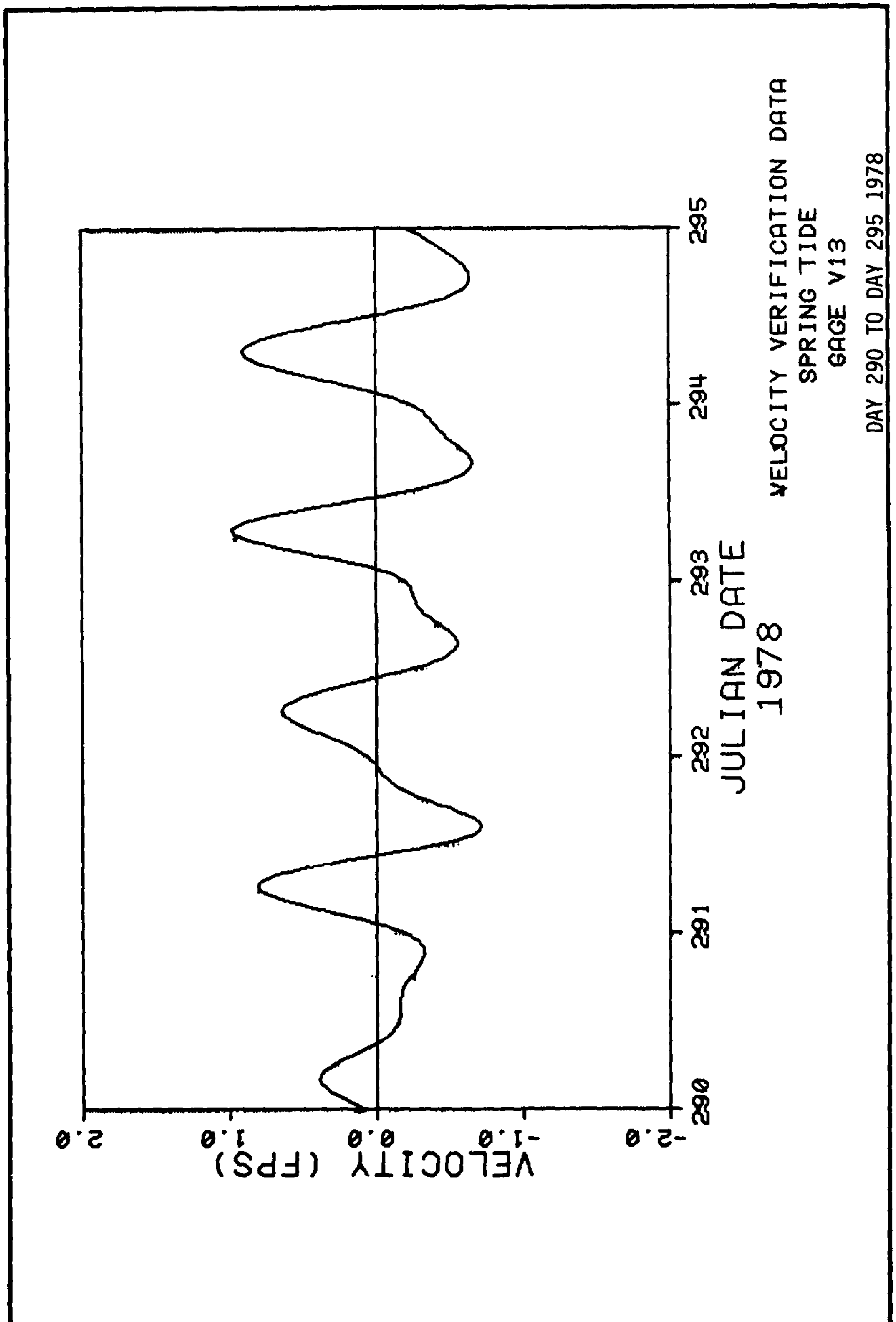
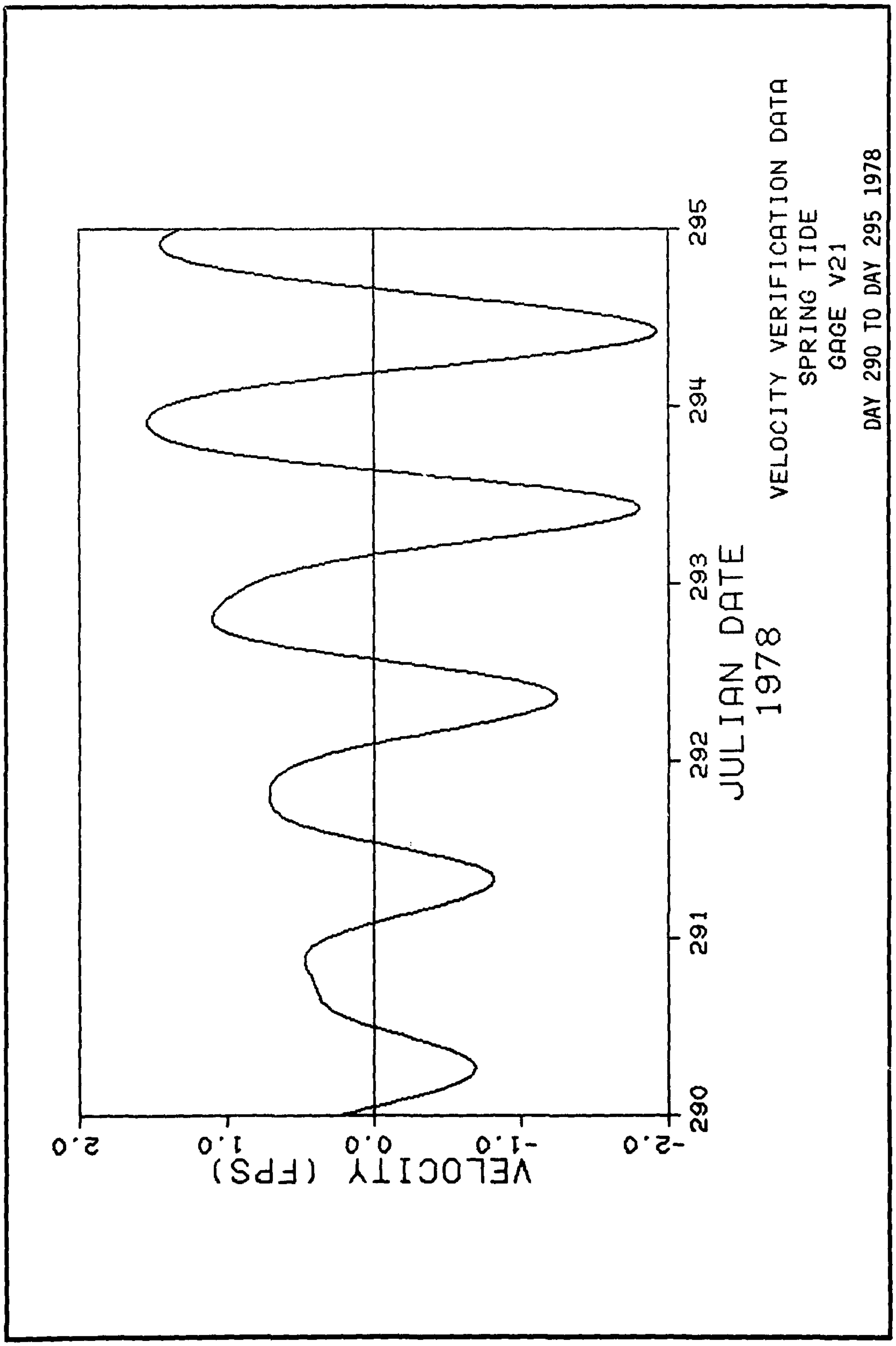
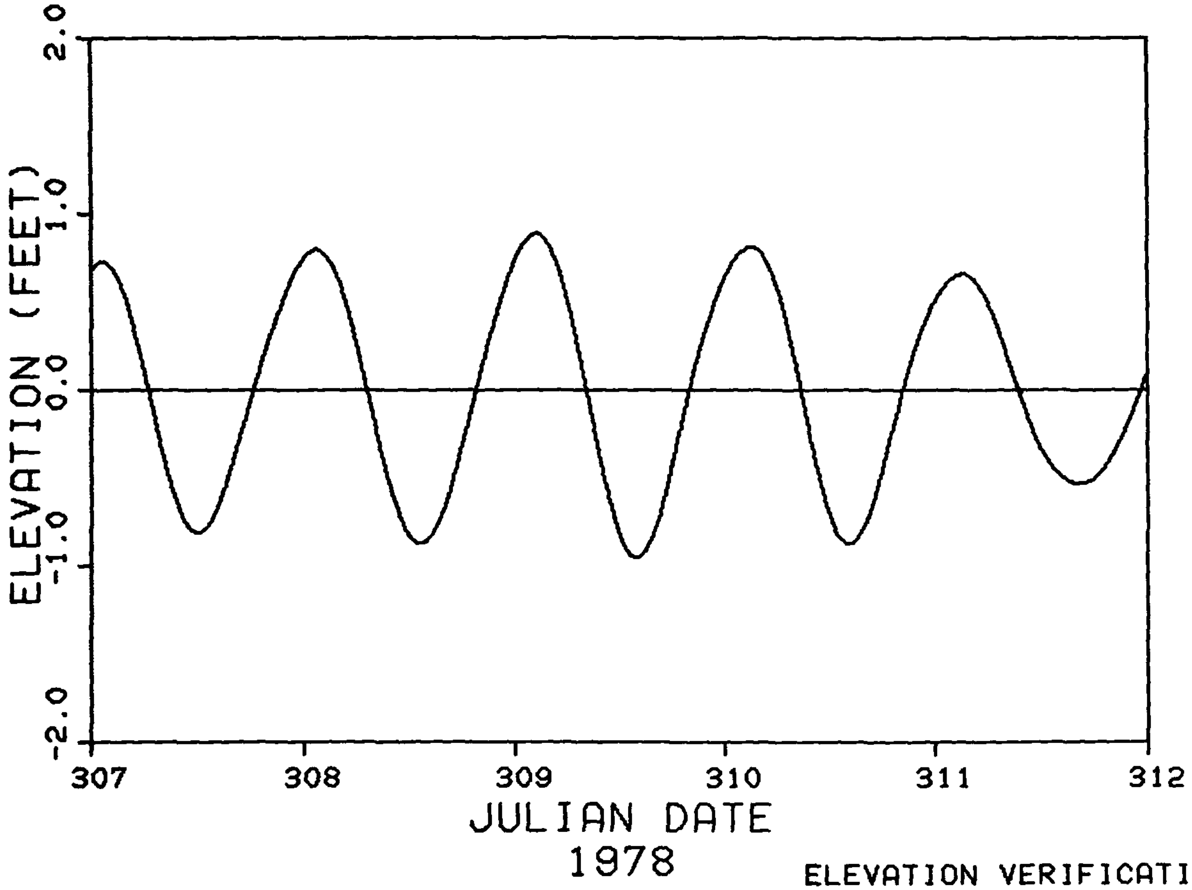

VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V13
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E52



VELOCITY VERIFICATION DATA
SPRING TIDE
GAGE V21
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

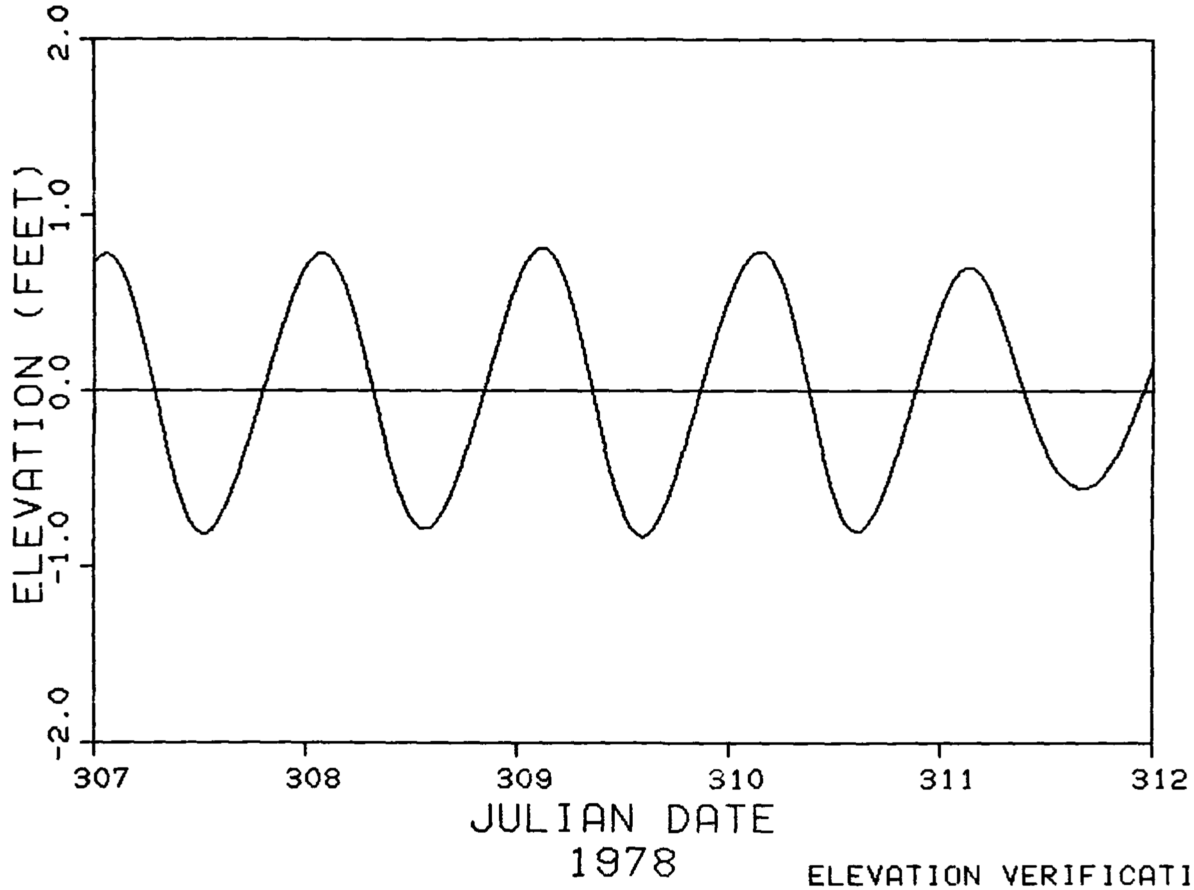
PLATE E53



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

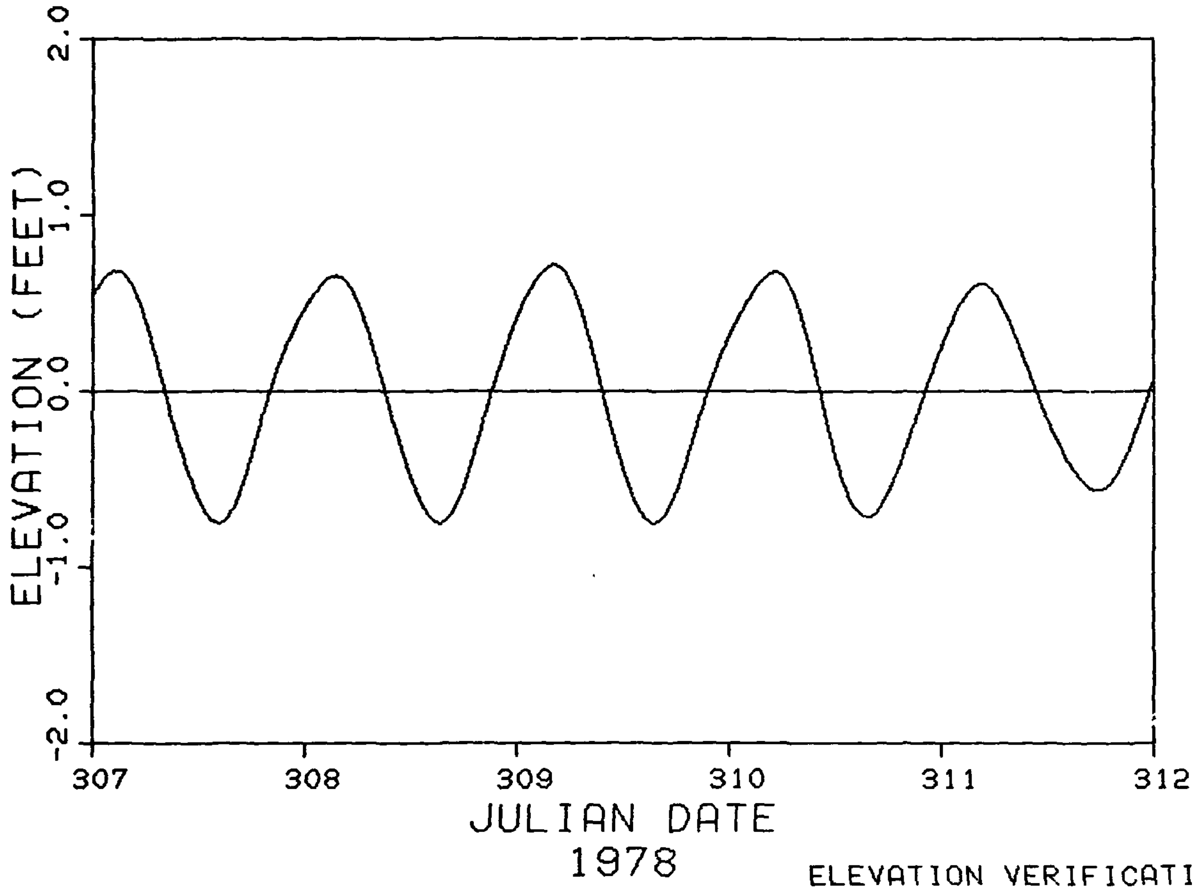
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-2

DAY 307 TO DAY 312 1978



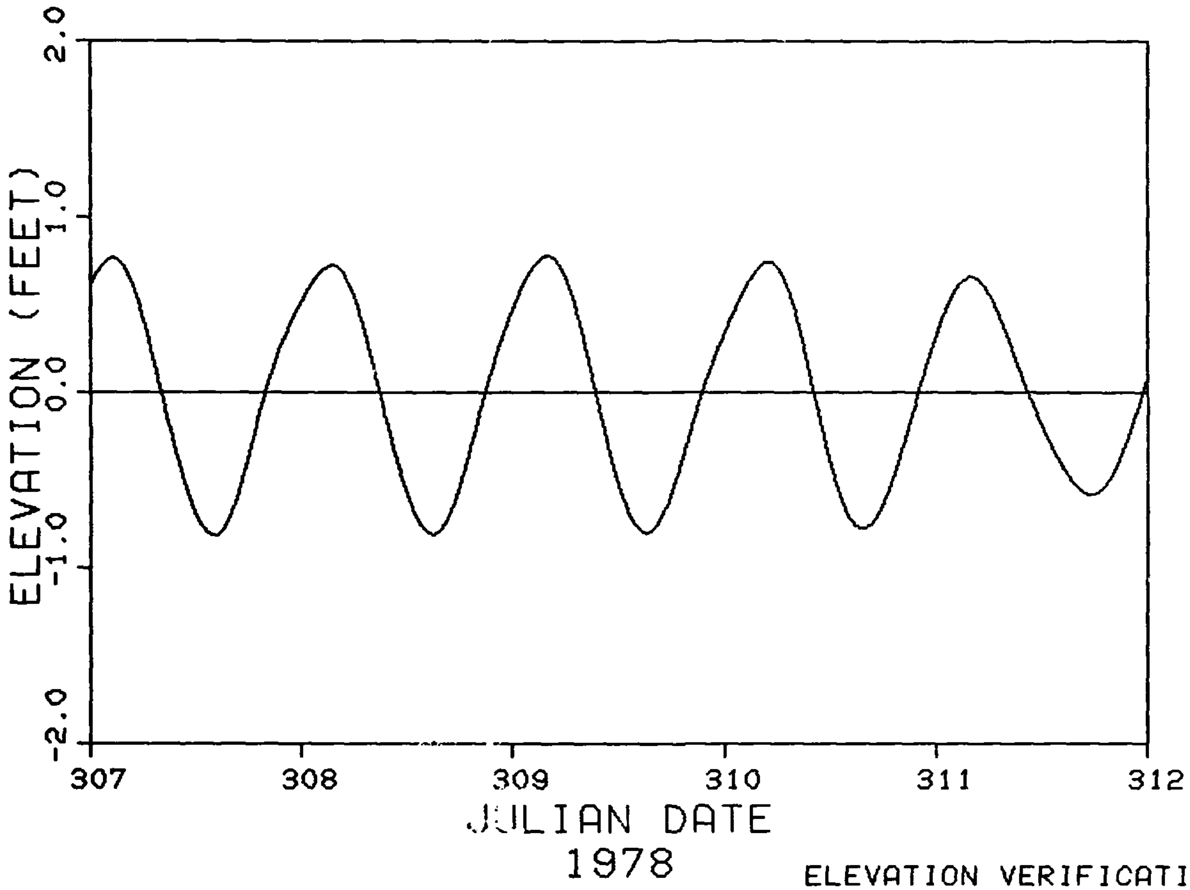
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-3
DAY 307 TO DAY 312 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-4
DAY 307 TO DAY 312 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

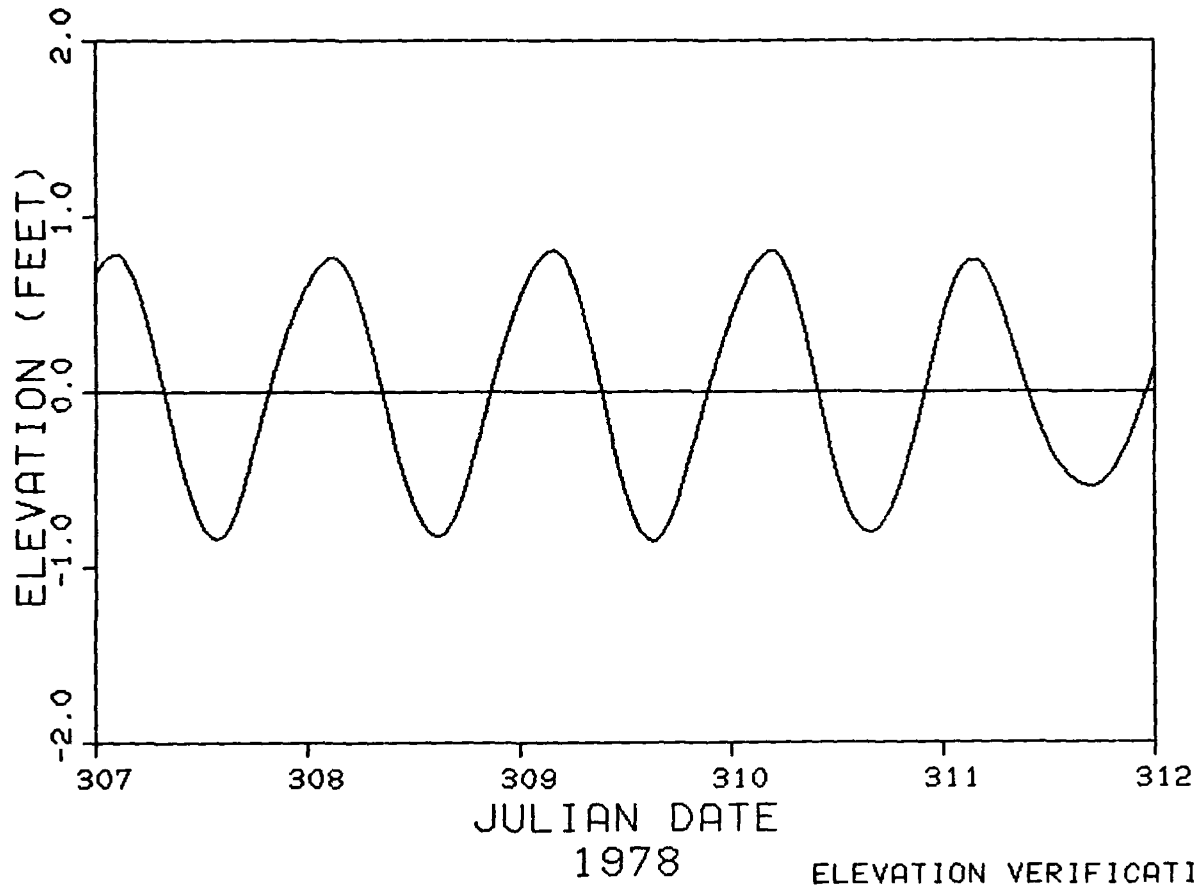


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-5

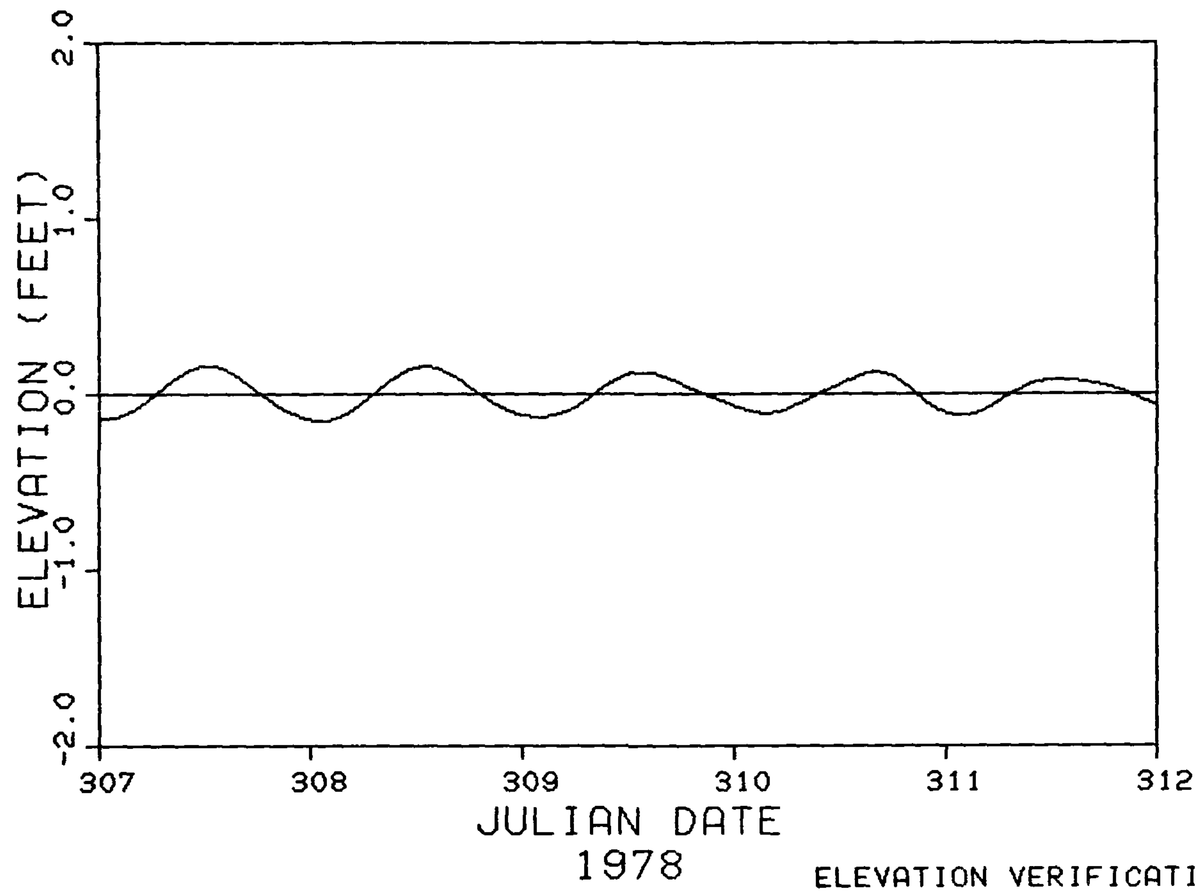
DAY 307 TO DAY 312 1978

PLATE E57



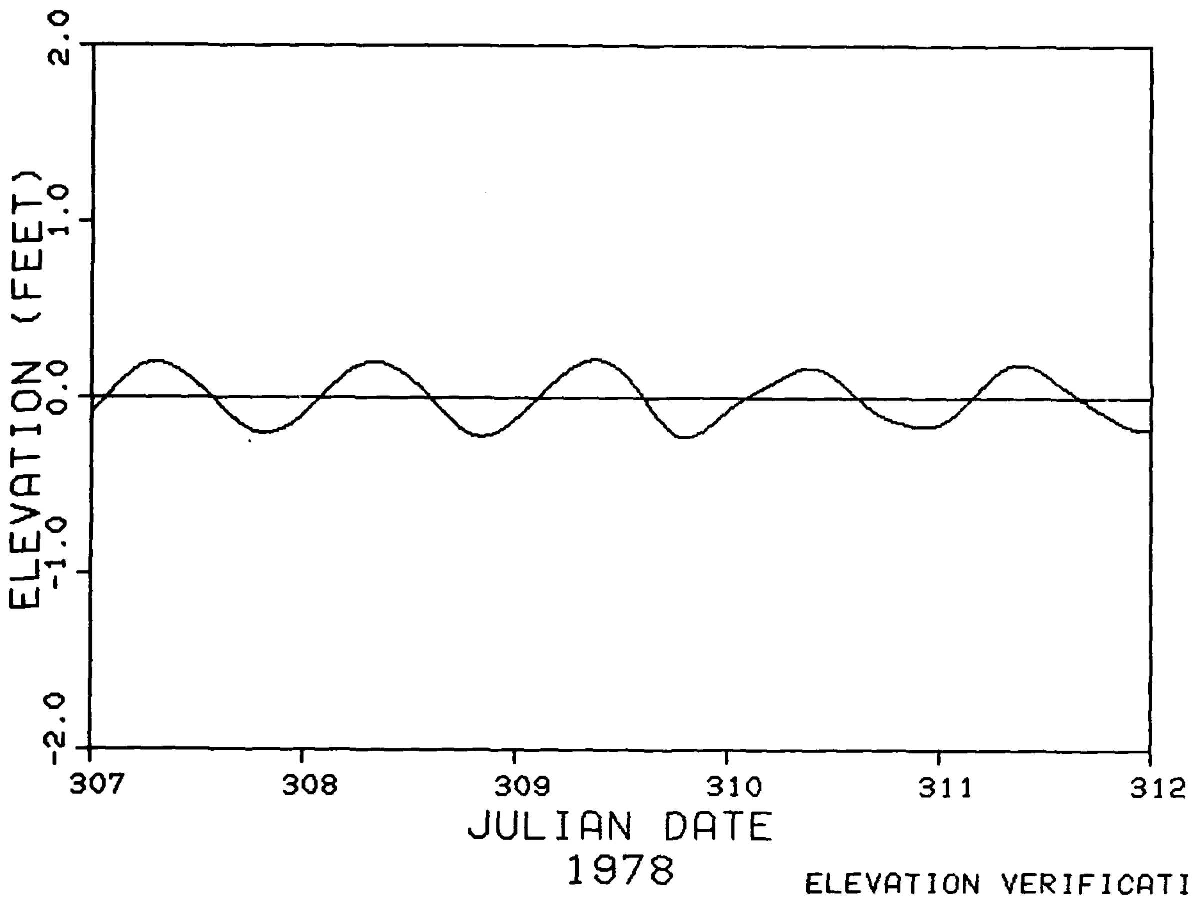
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE B-6
DAY 307 TO DAY 312 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

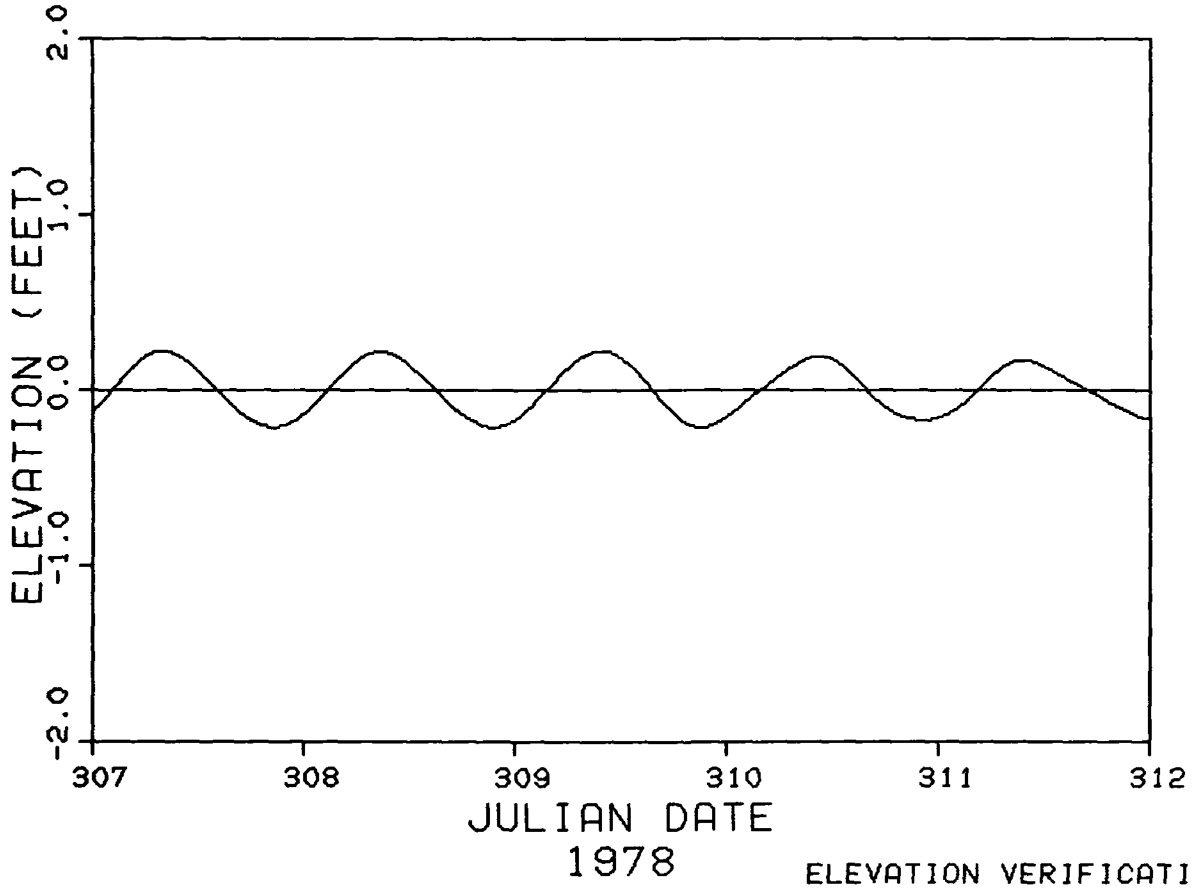
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE M-1
DAY 307 TO DAY 312 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-2
DAY 307 TO DAY 312 1978

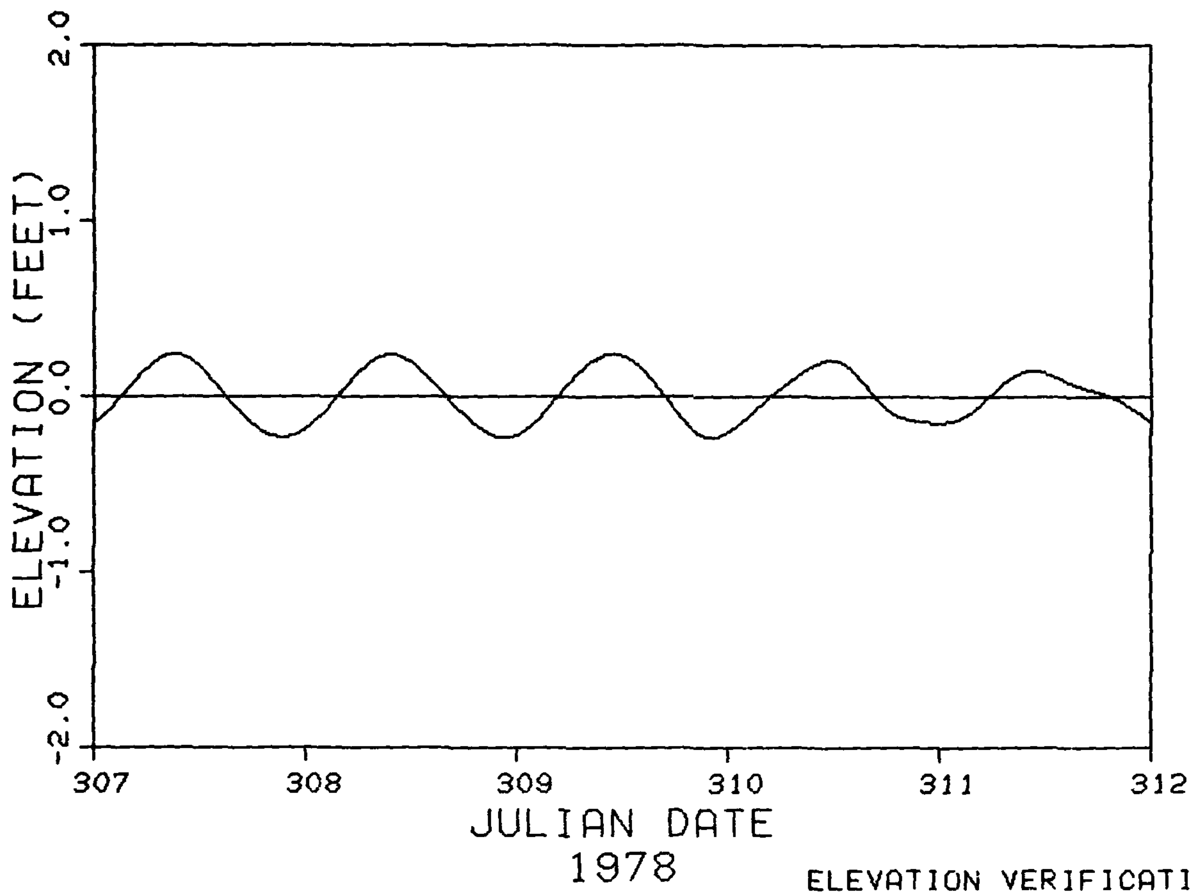
PLATE E60



ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-4

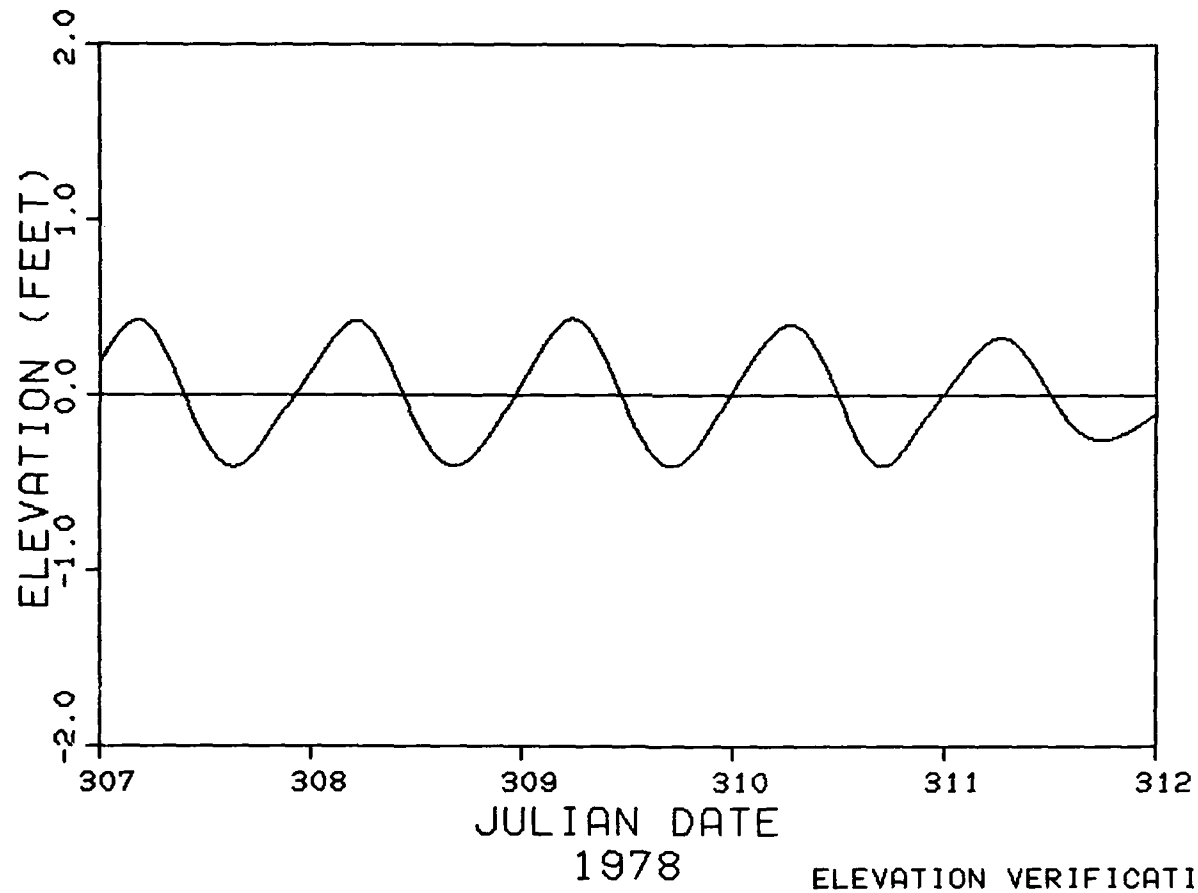
DAY 307 TO DAY 312 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

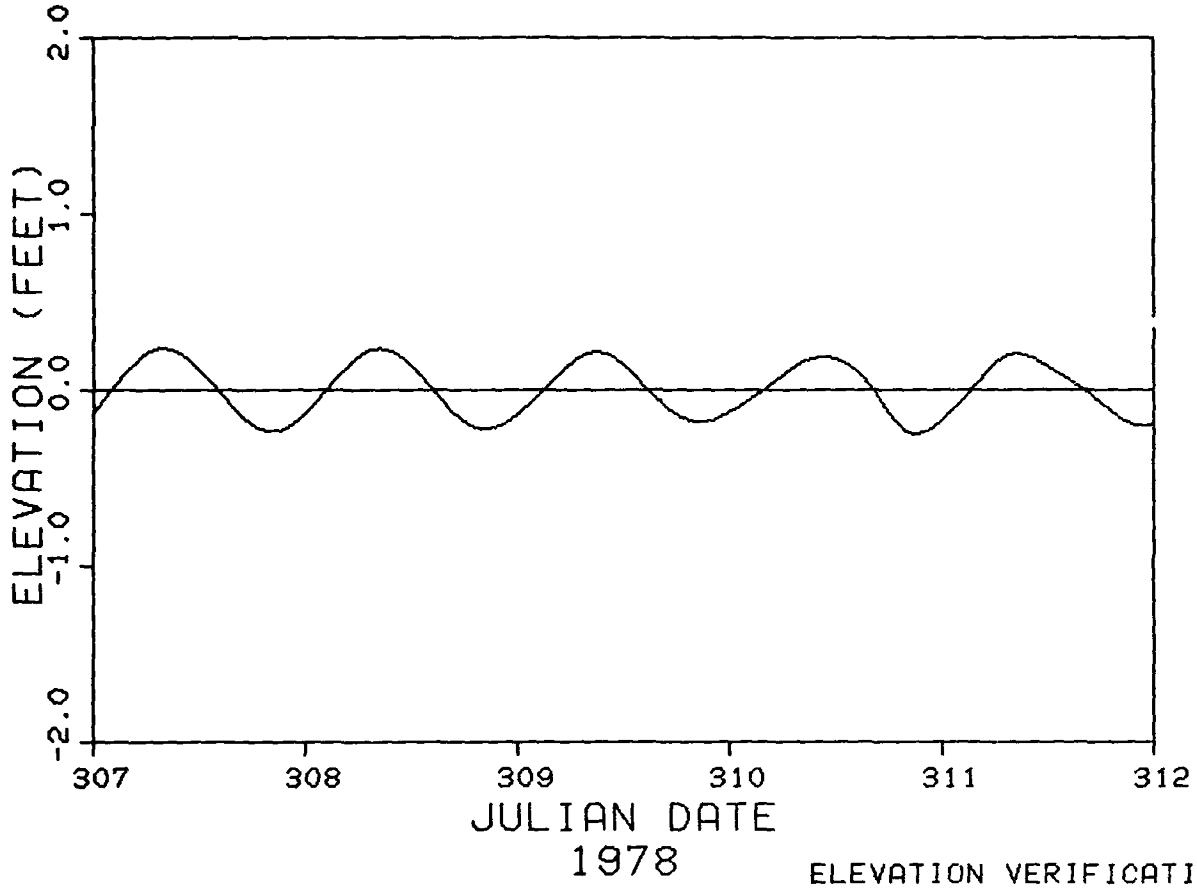
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-5
DAY 307 TO DAY 312 1978



ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-6

DAY 307 TO DAY 312 1978

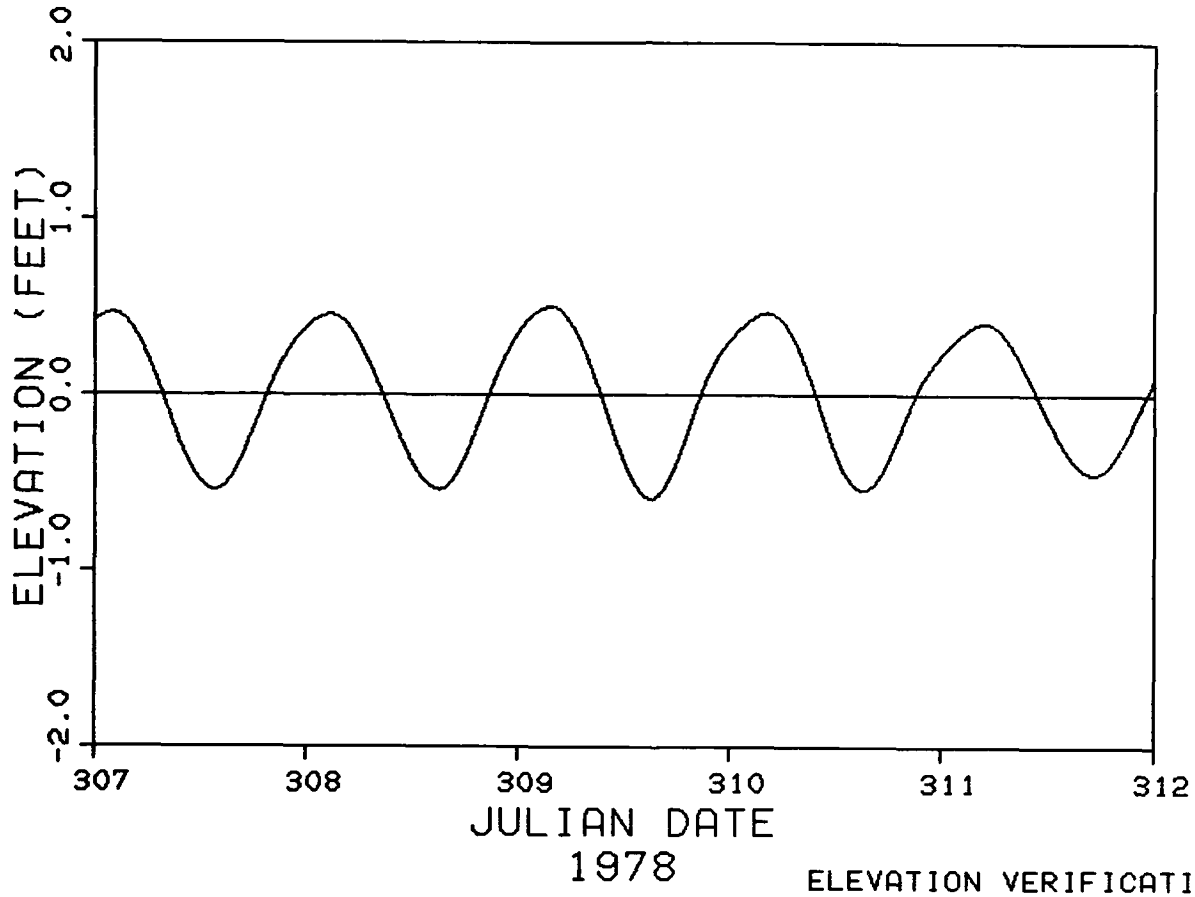
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE P-7

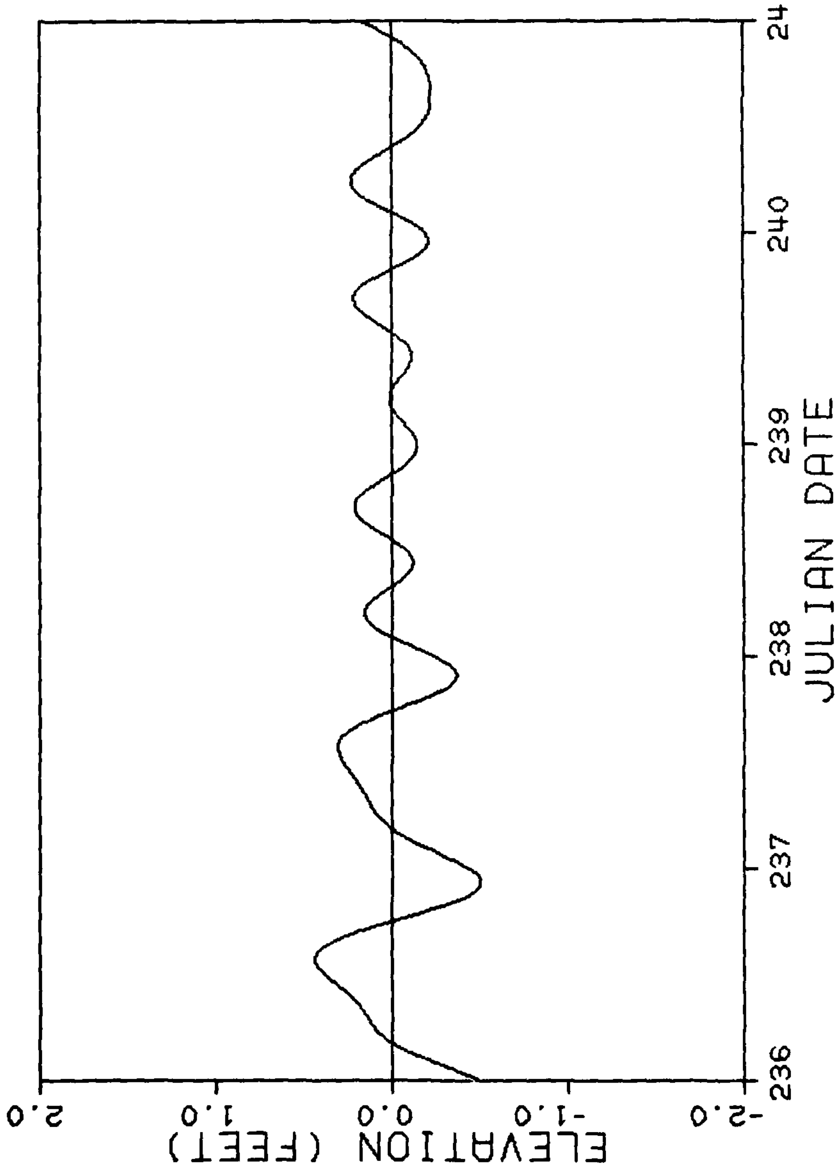
DAY 307 TO DAY 312 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

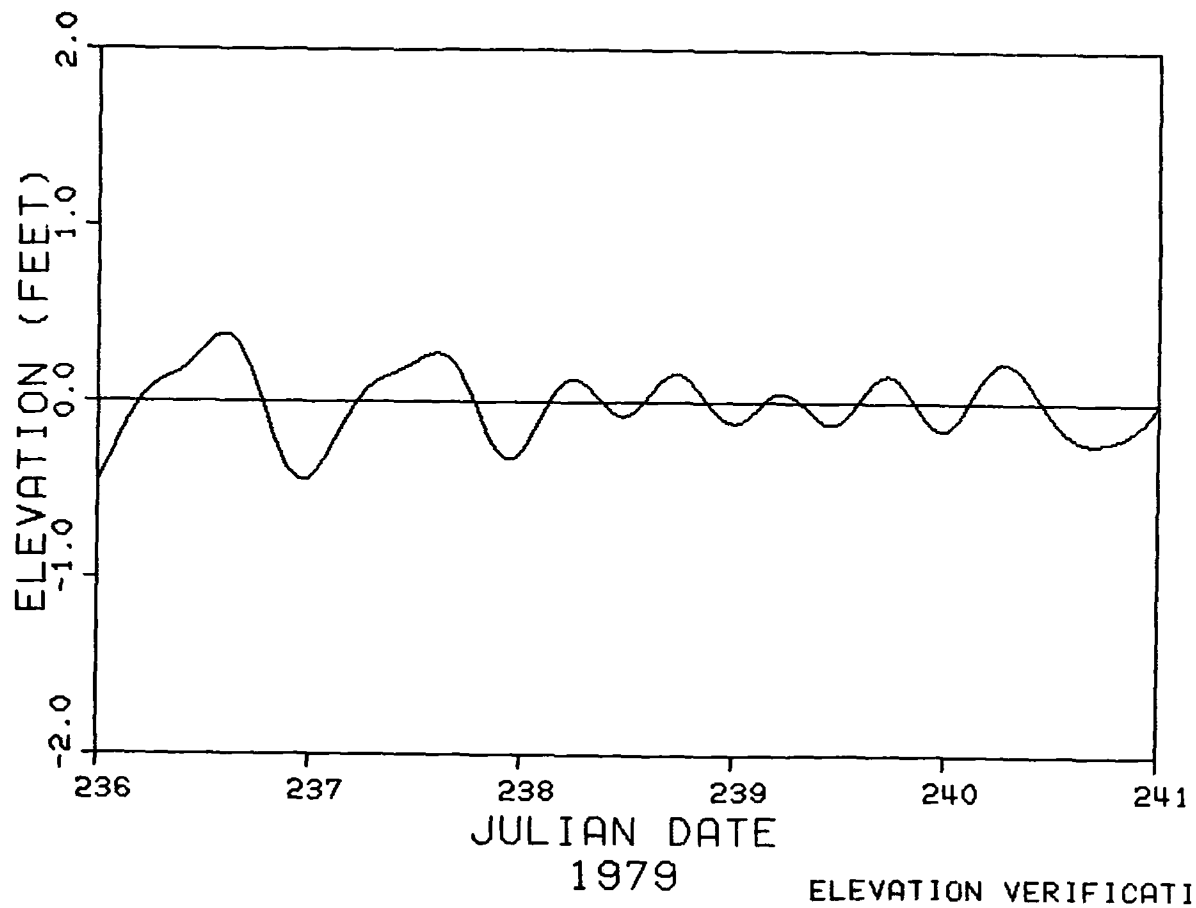
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE R-1

DAY 307 TO DAY 312 1978



ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE B-2
DAY 236 TO DAY 241 1979

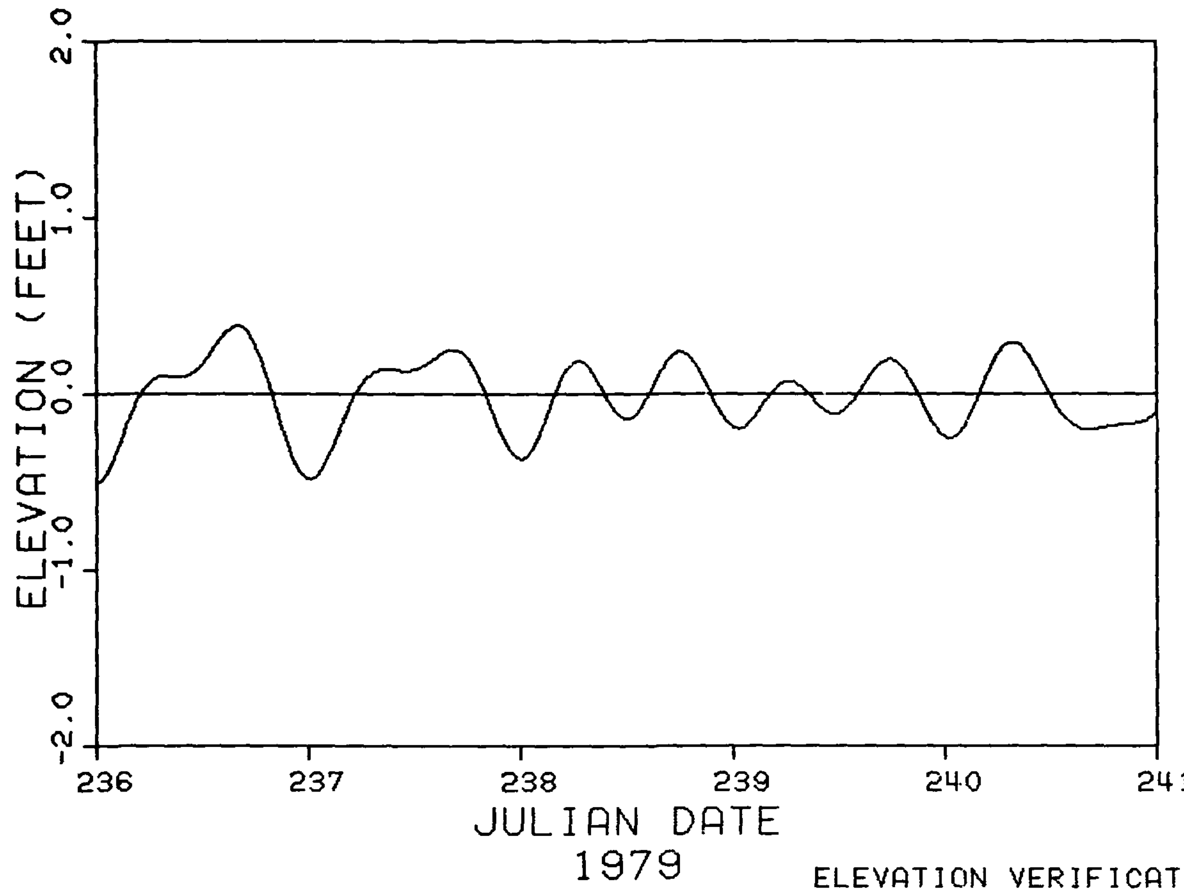
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

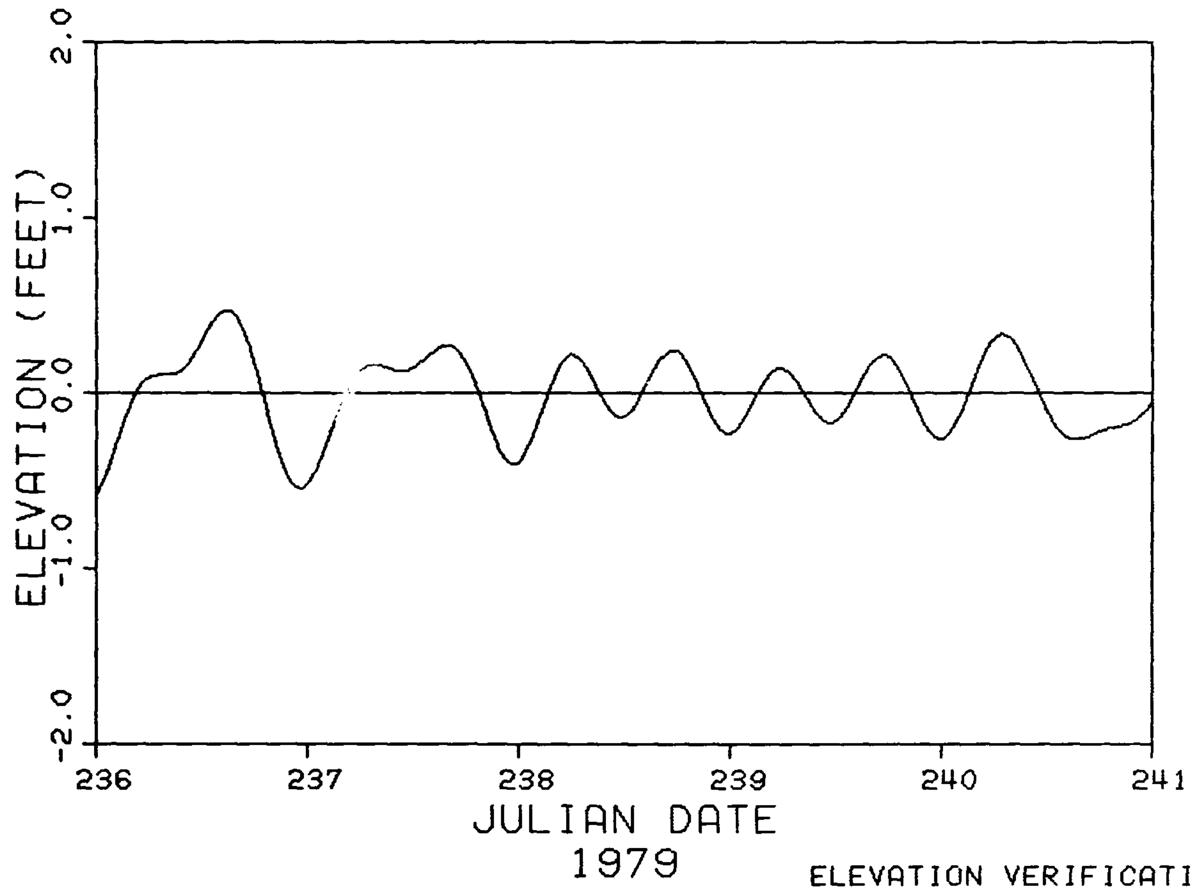
ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE B-3

DAY 236 TO DAY 241 1979



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

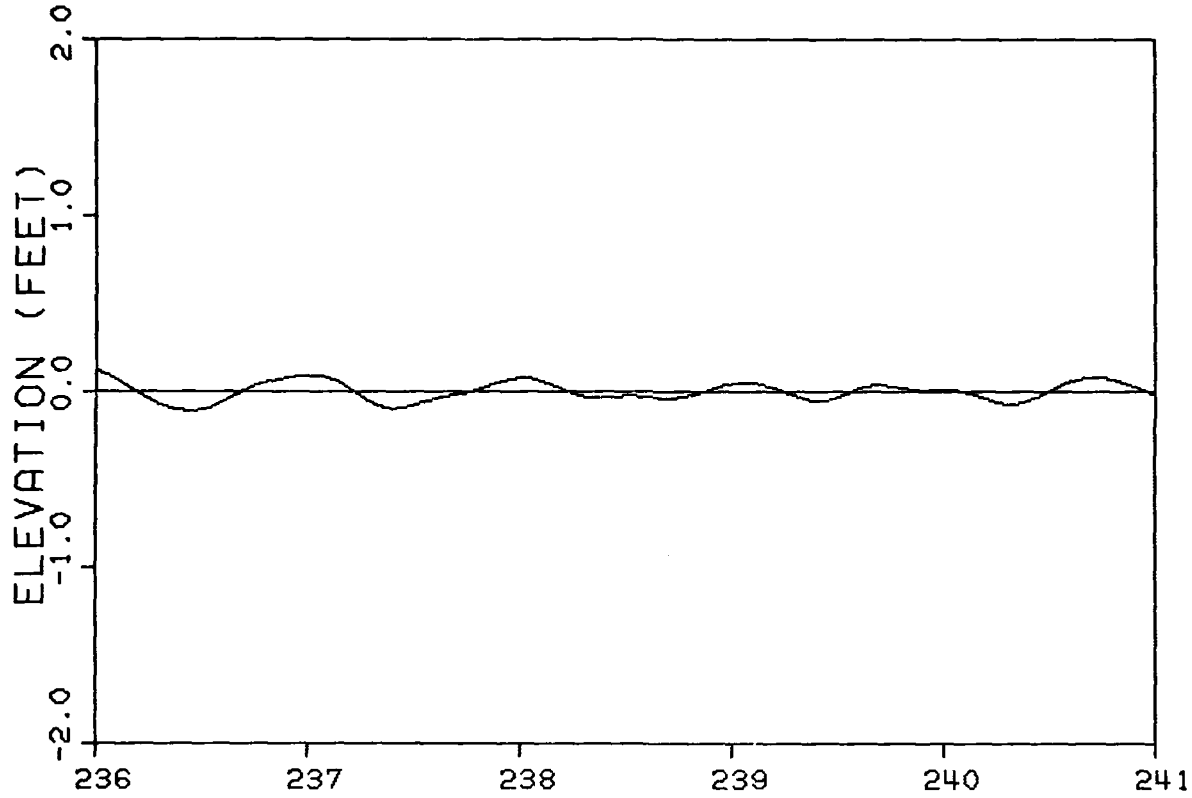
ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE B-4
DAY 236 TO DAY 241 1979



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

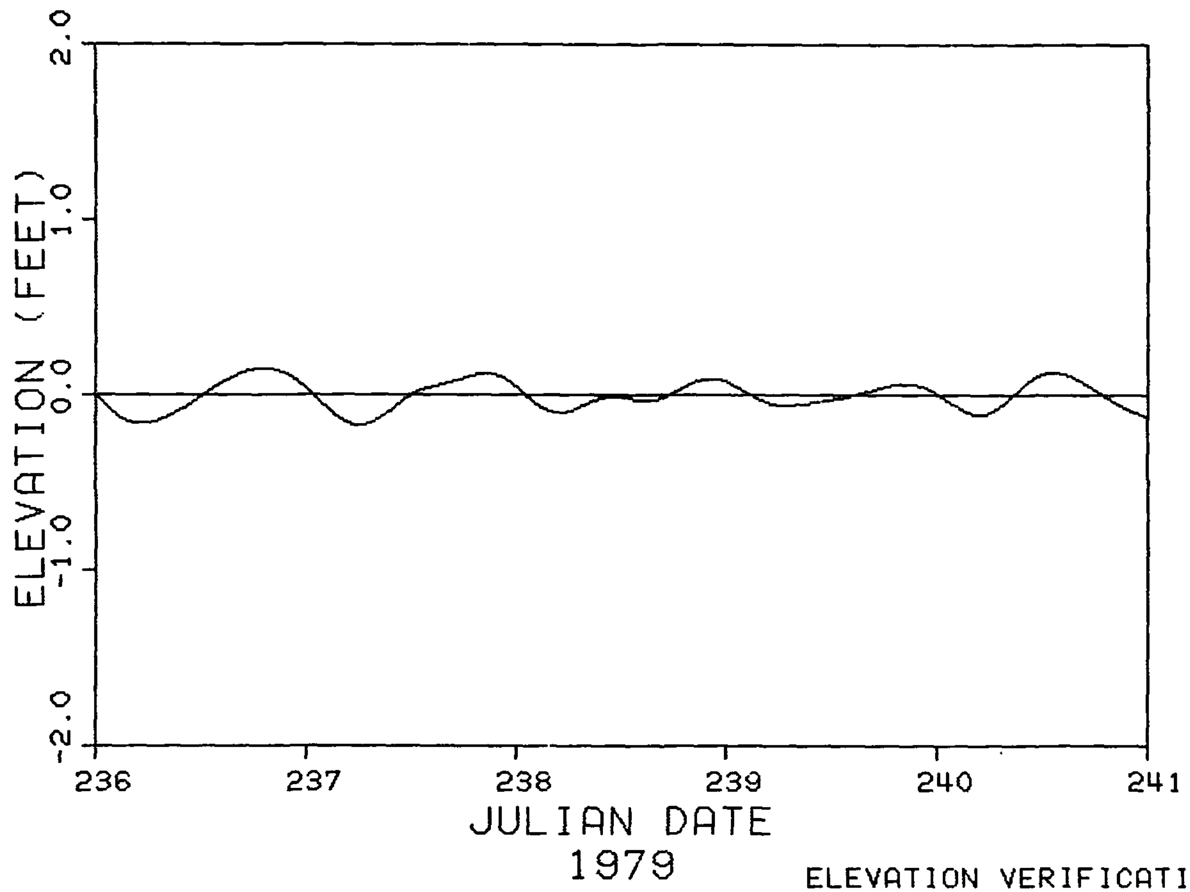
ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE B-6

DAY 236 TO DAY 241 1979



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

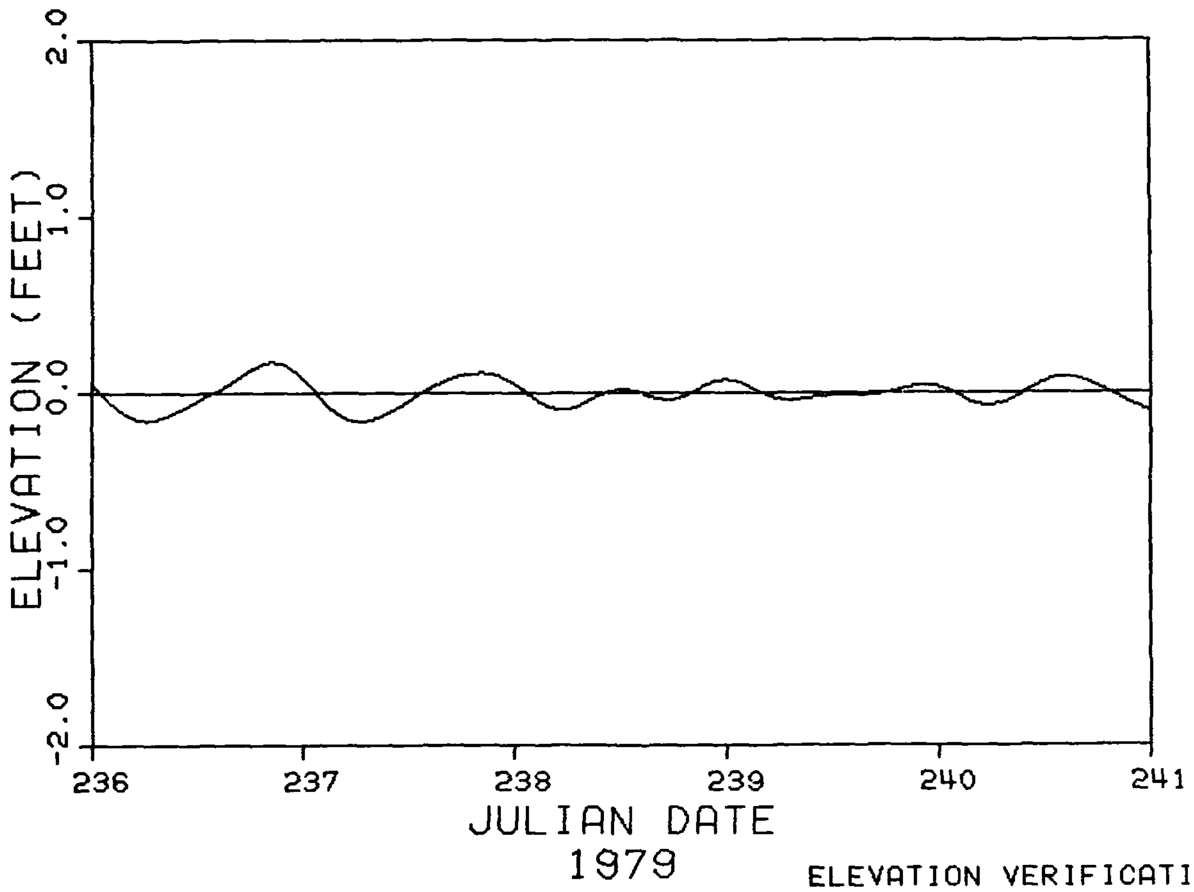
ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE M-1
DAY 236 TO DAY 241 1979



ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE P-3

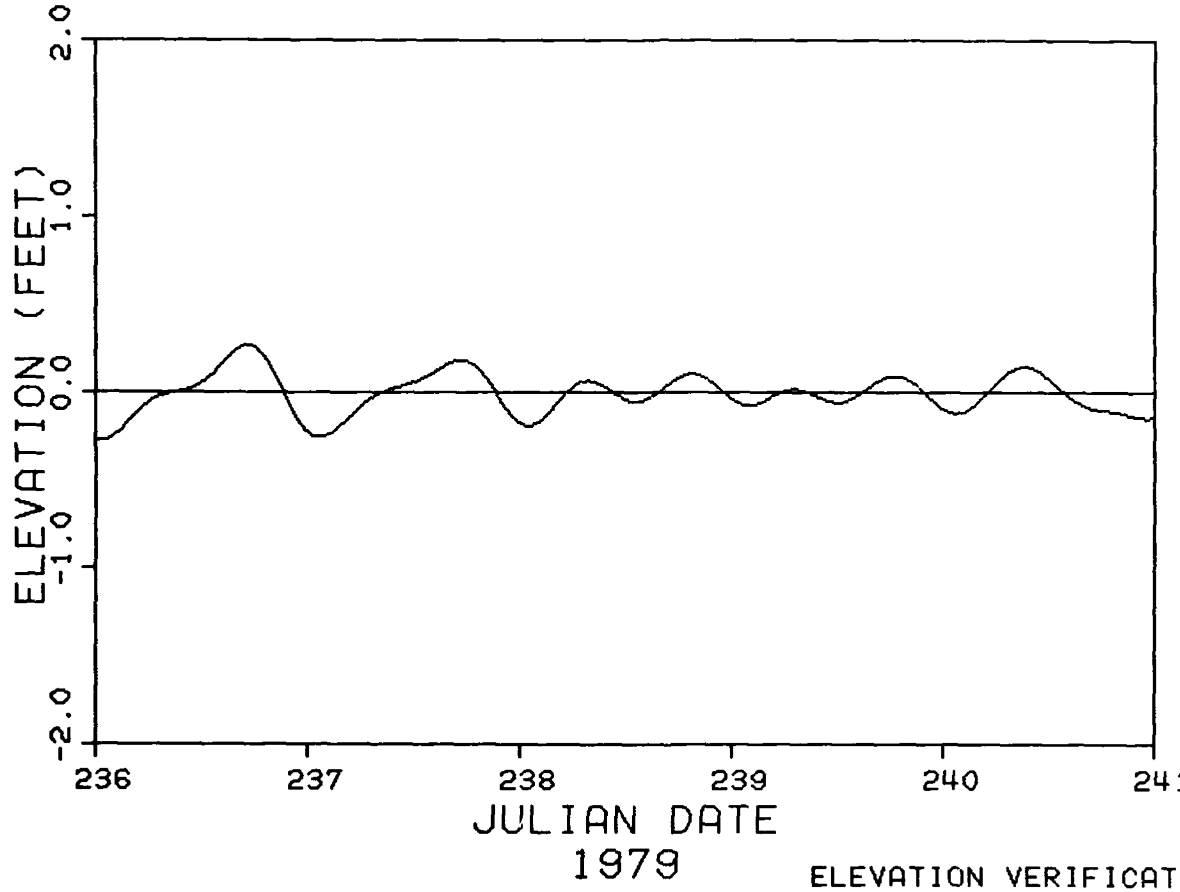
DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

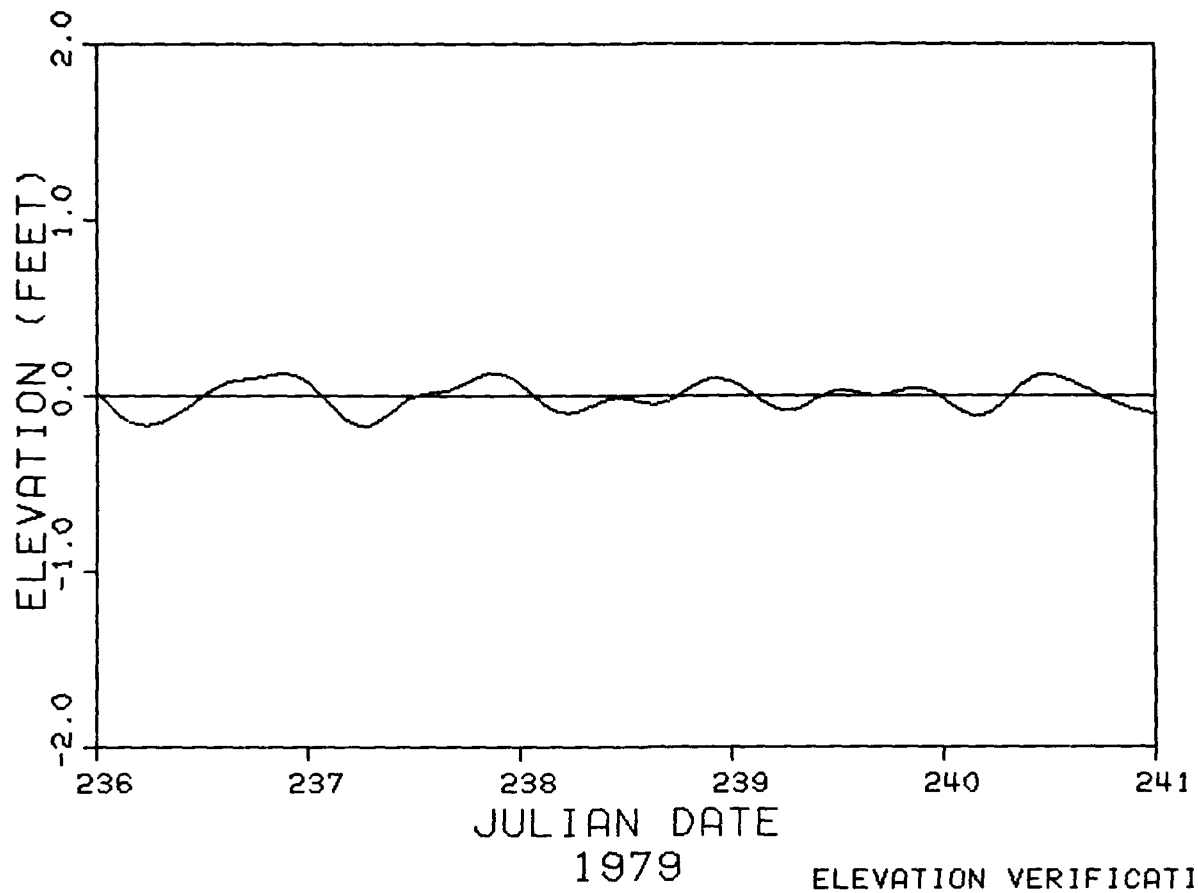
ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE P-5
DAY 236 TO DAY 241 1979



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE P-6

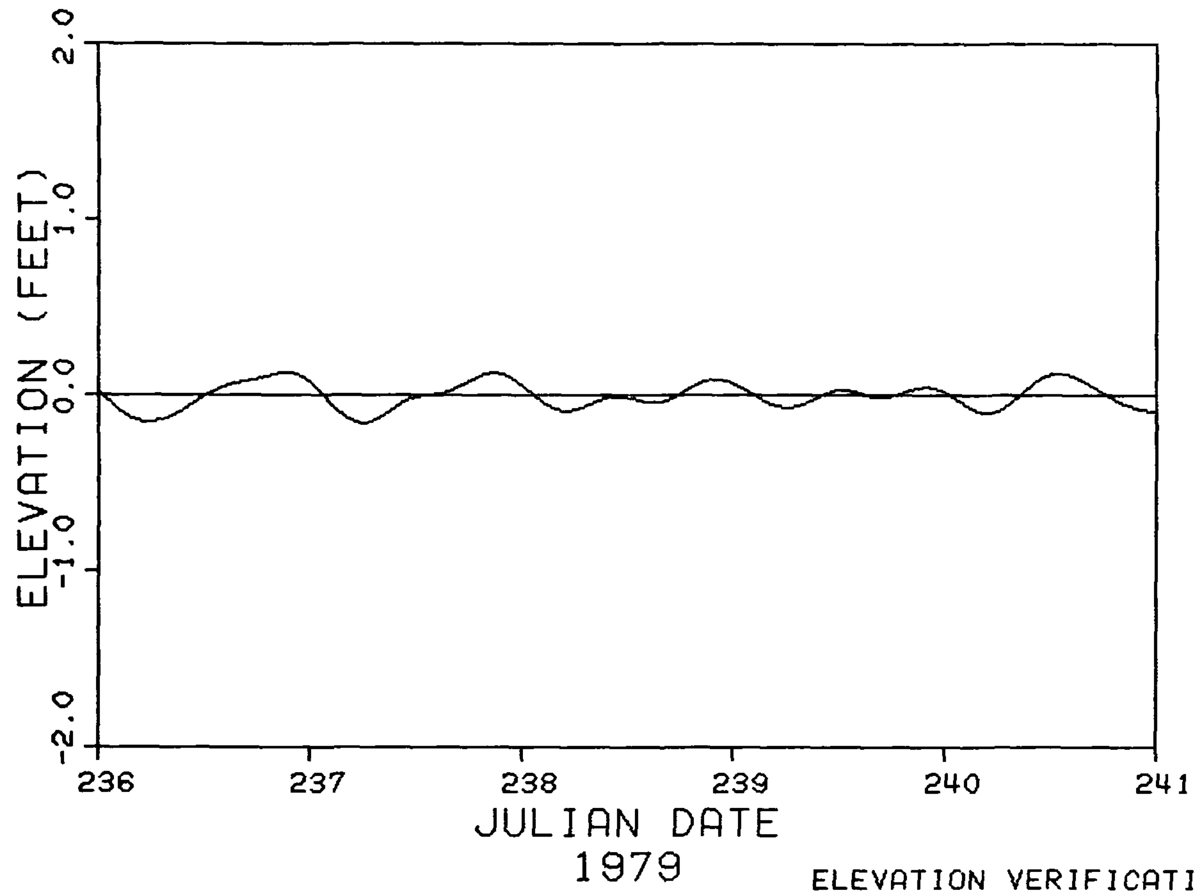
DAY 236 TO DAY 241 1979



ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE P-8

DAY 236 TO DAY 241 1979

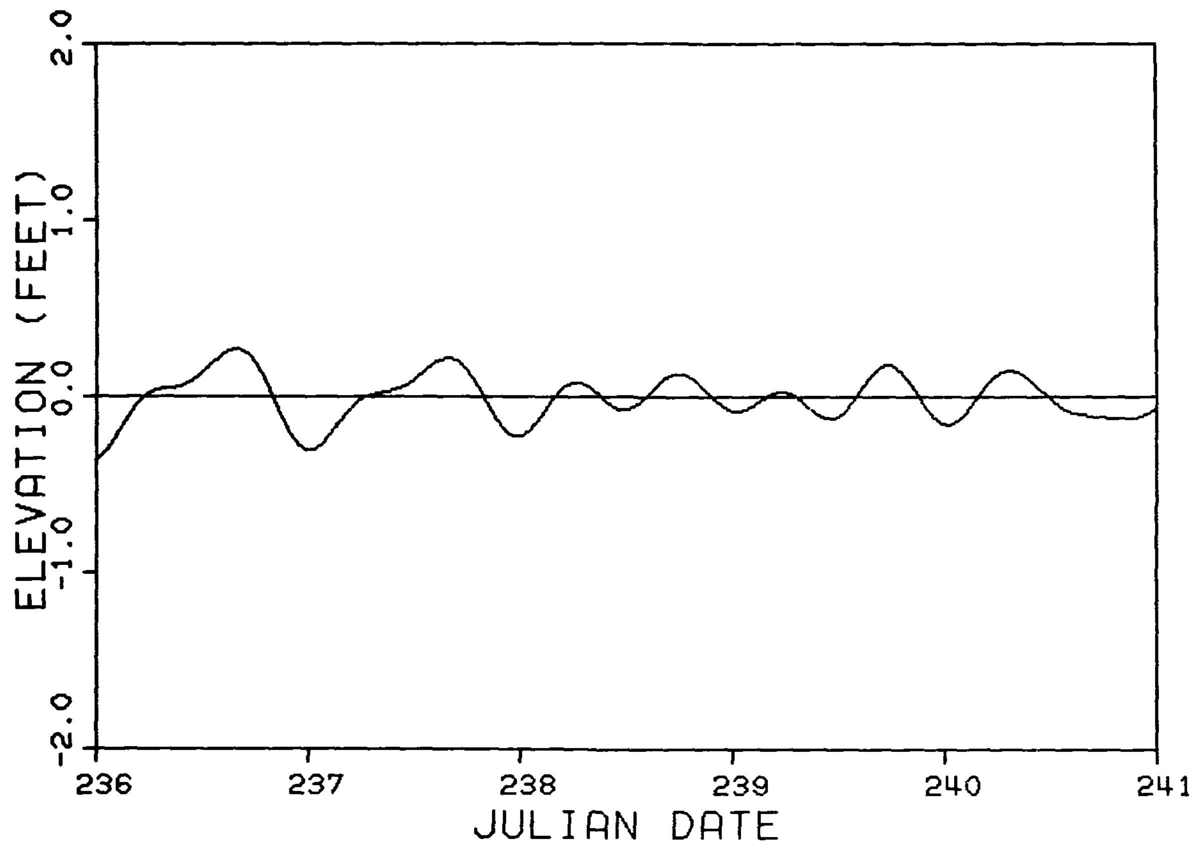
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE P-9

DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

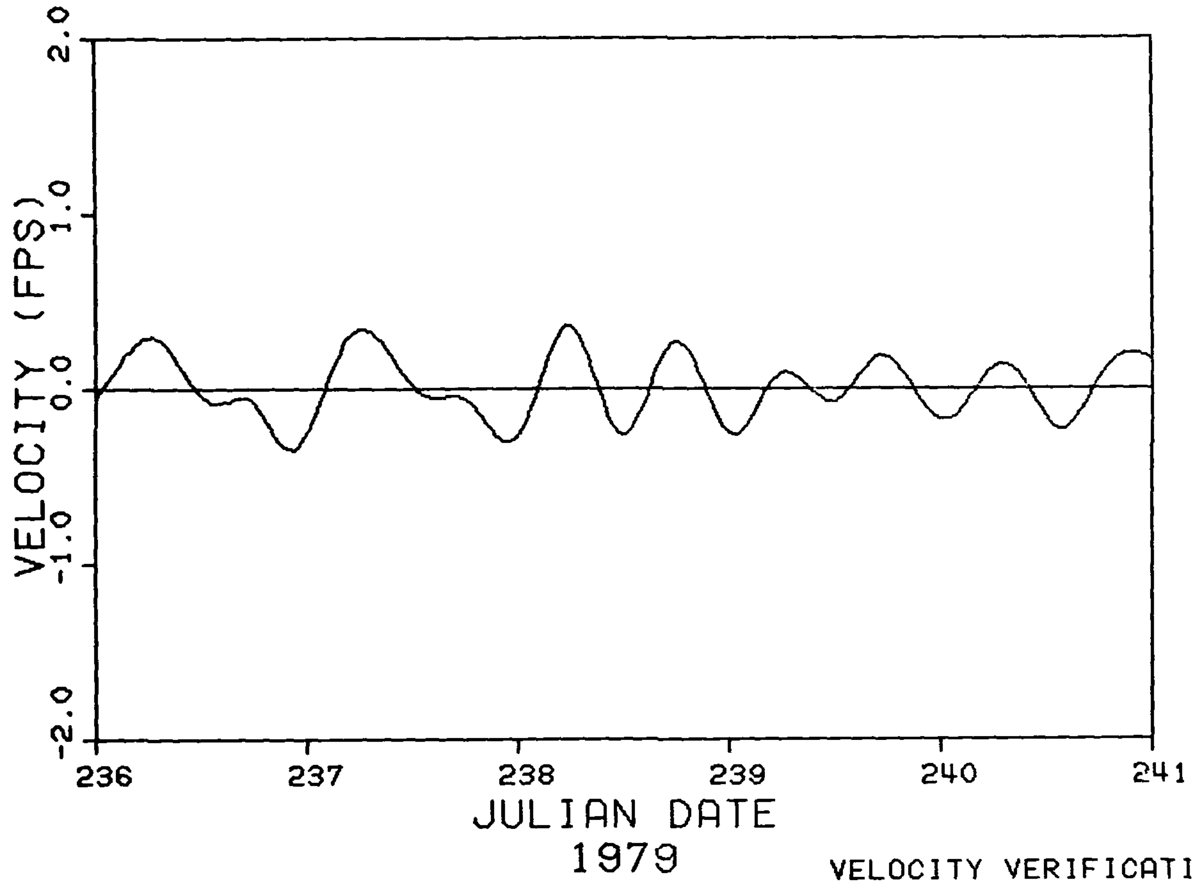


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE R-1

DAY 236 TO DAY 241 1979

PLATE E76



VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C5
DAY 236 TO DAY 241 1979

PLATE E77

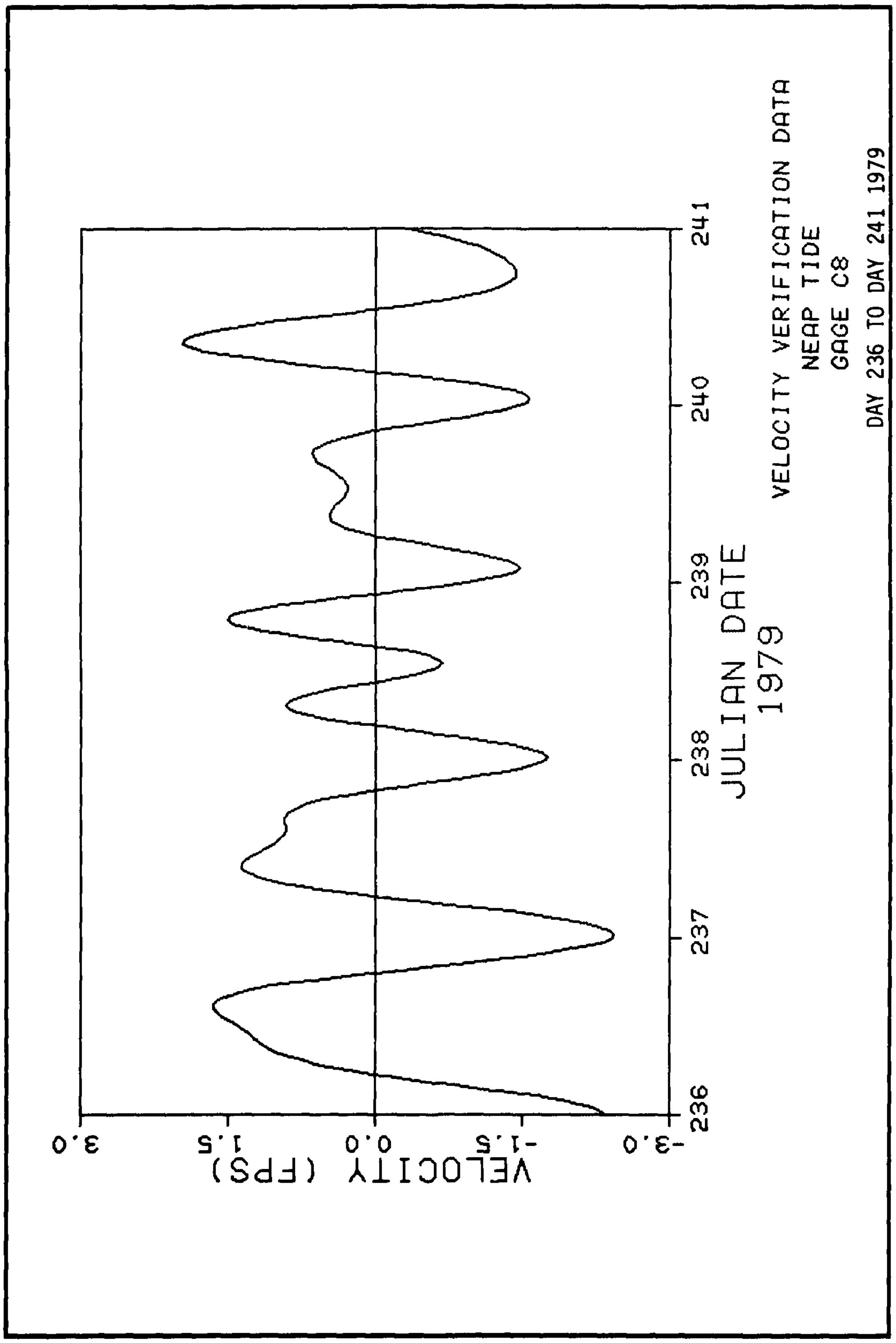
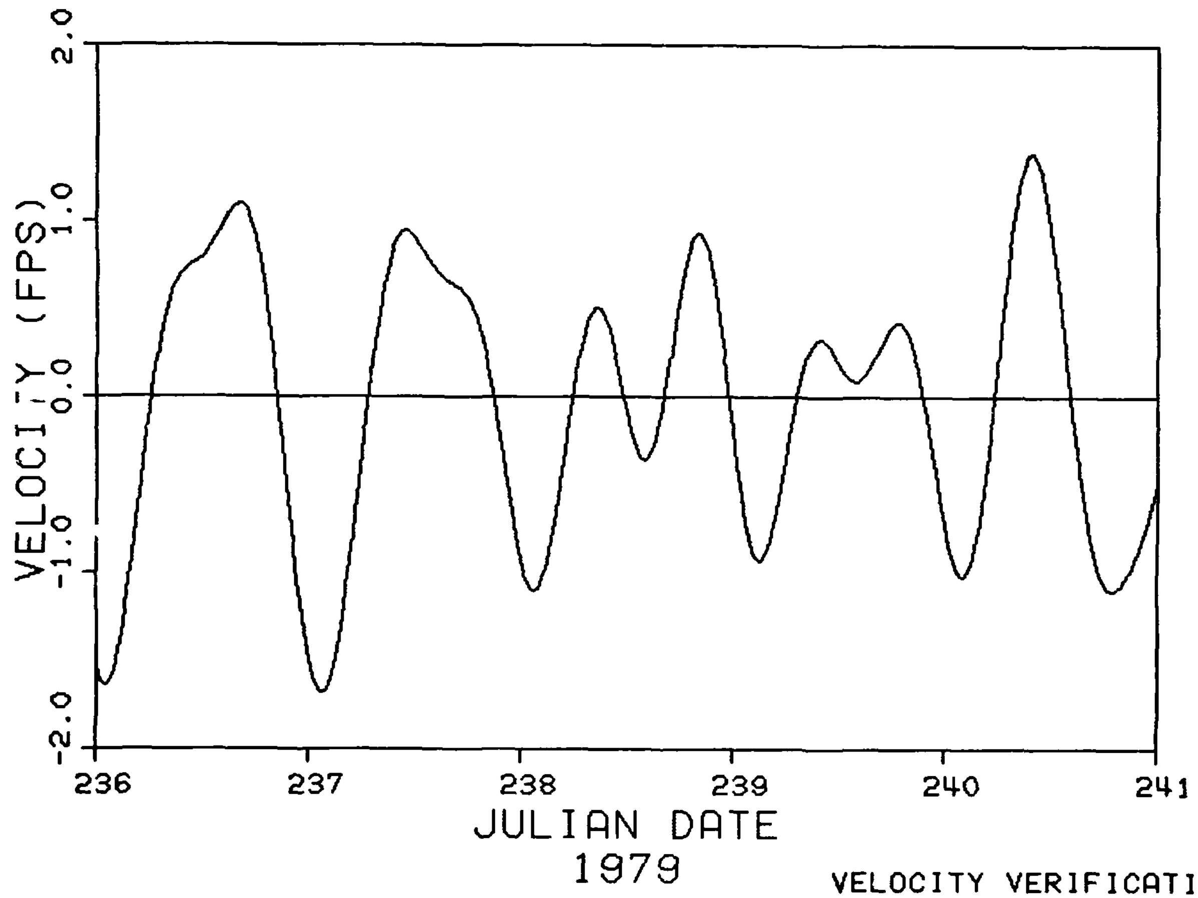

VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C8
DAY 236 TO DAY 241 1979
VELOCITY (FPS)
-3.0
-1.5
0.0
1.5
3.0
JULIAN DATE
1979
236
237
238
239
240
241

PLATE E78



VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C9
DAY 236 TO DAY 241 1979

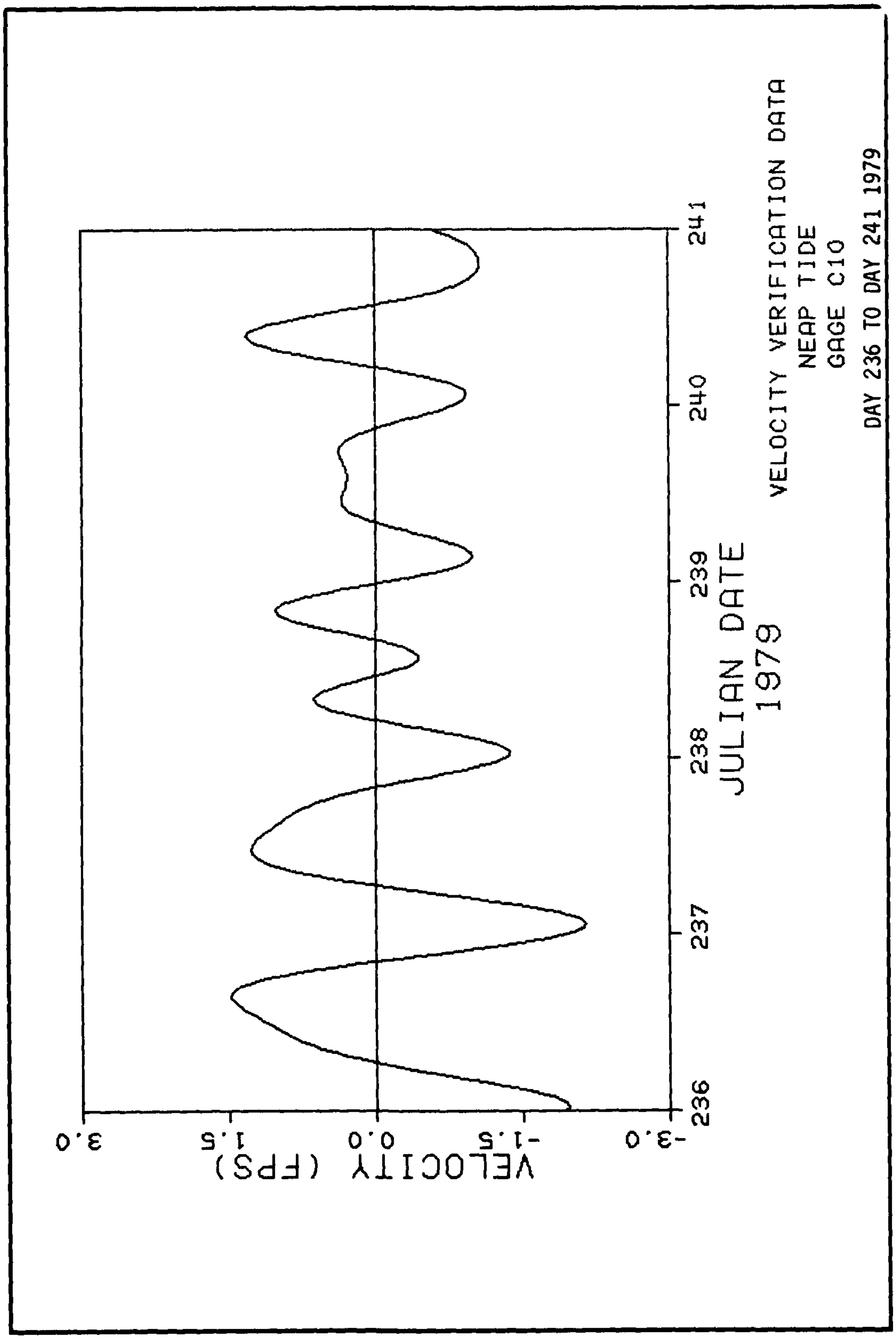
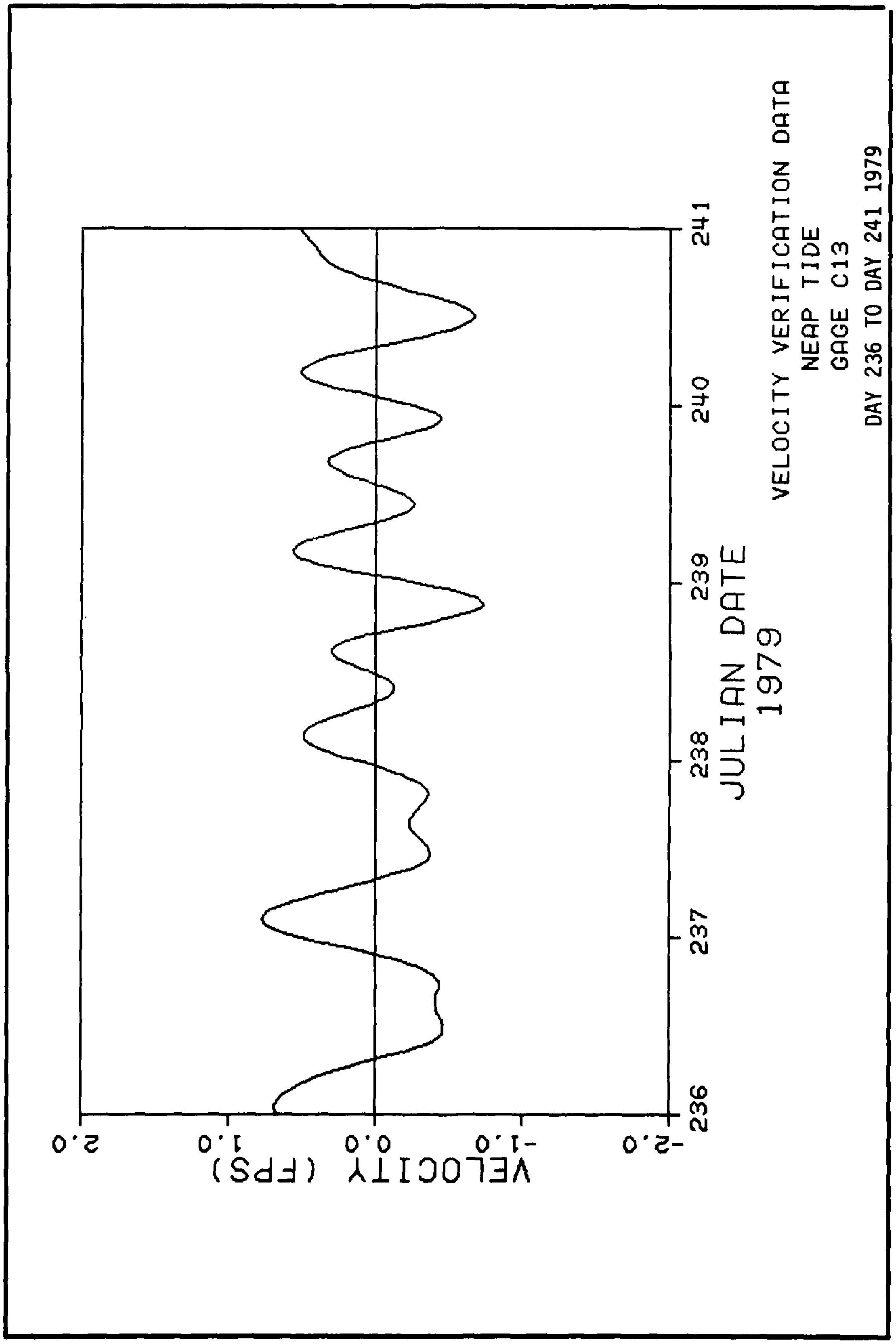
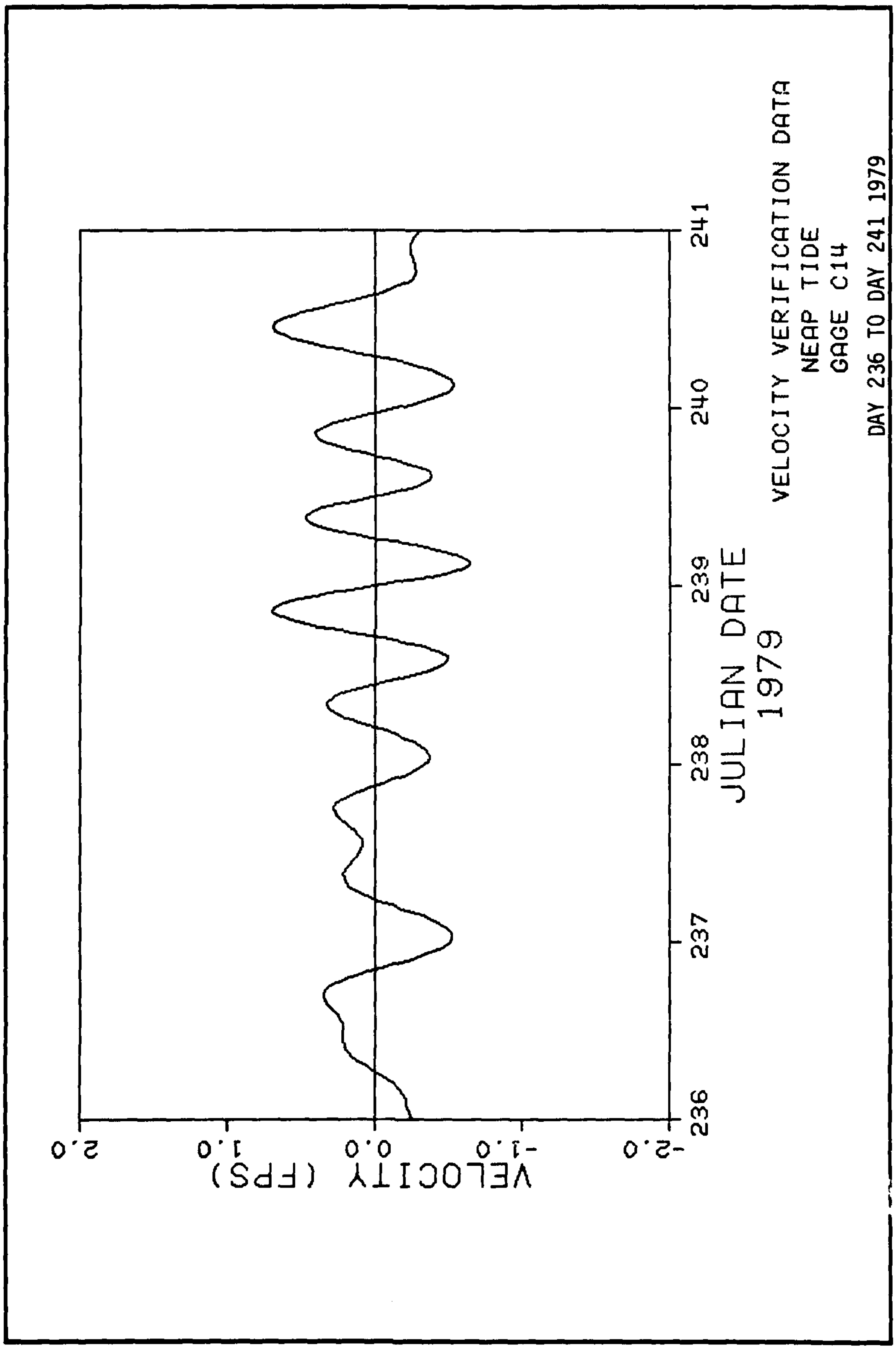

VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C10
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
VELOCITY (FPS)
3.0
1.5
0.0
-1.5
-3.0
236
237
238
239
240
241

PLATE E80

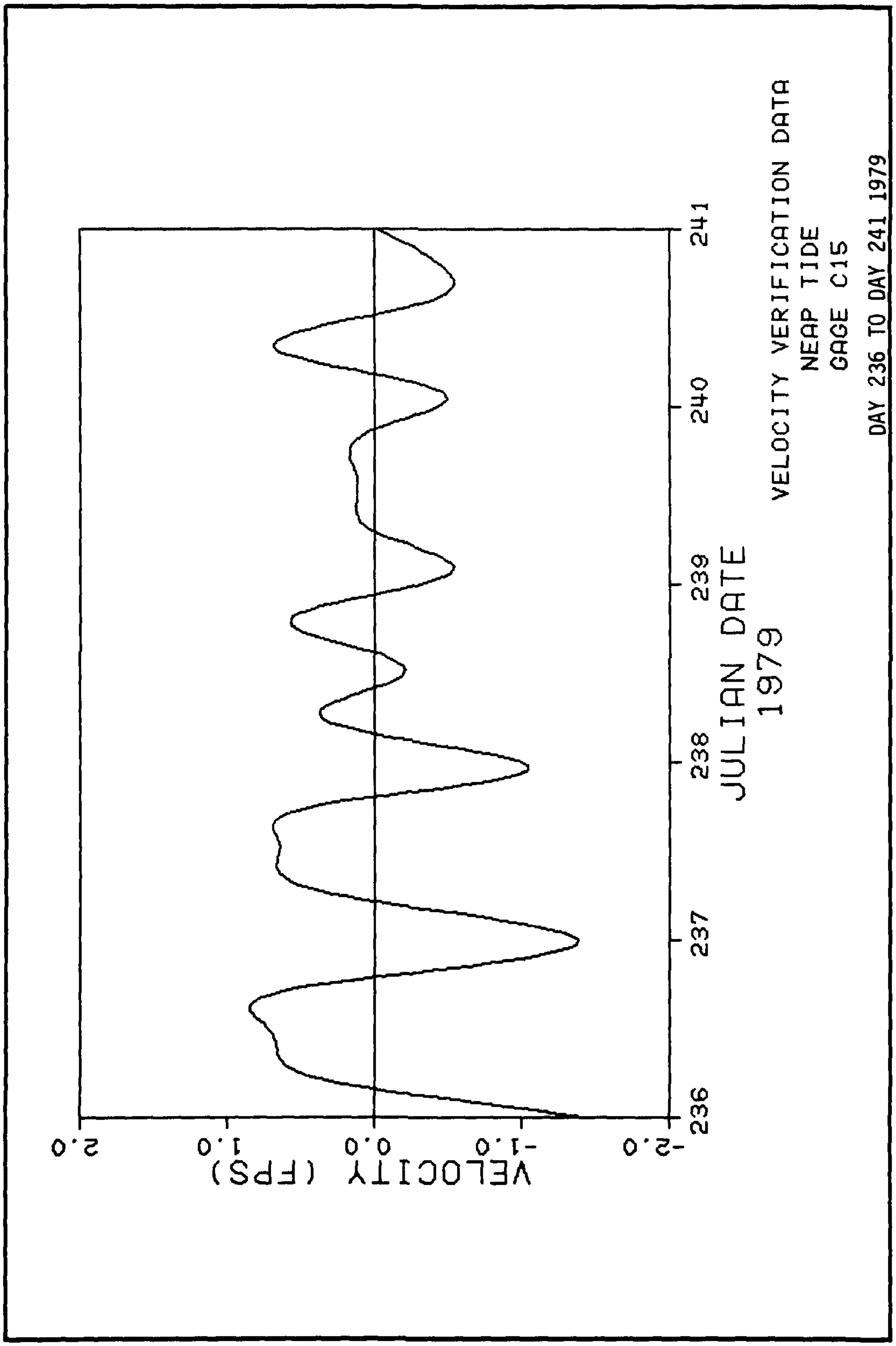


VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C13
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241



VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C14
DAY 236 TO DAY 241 1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241
JULIAN DATE
1979

PLATE E82


VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C15
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241

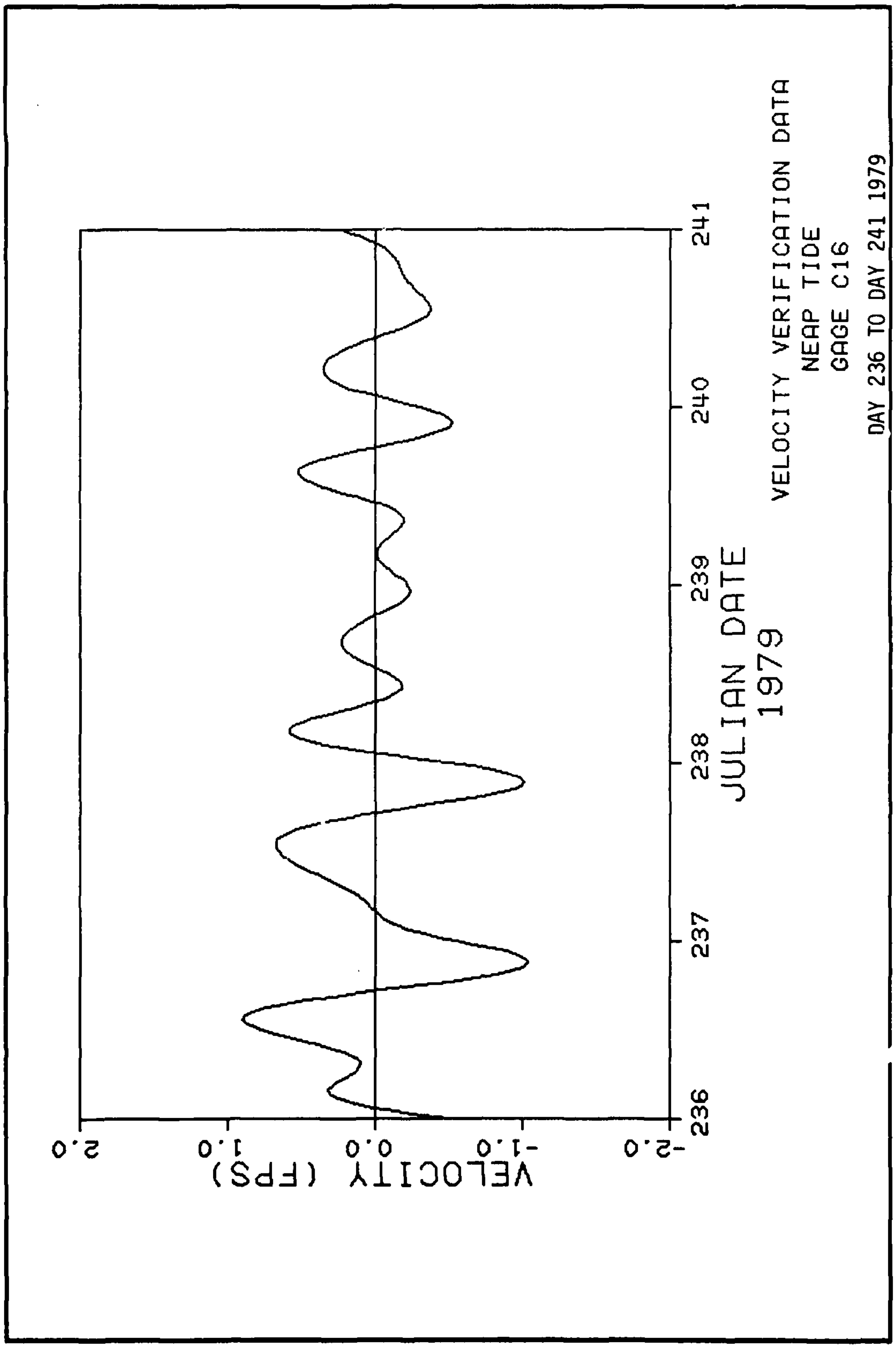

VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C16
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241

PLATE E

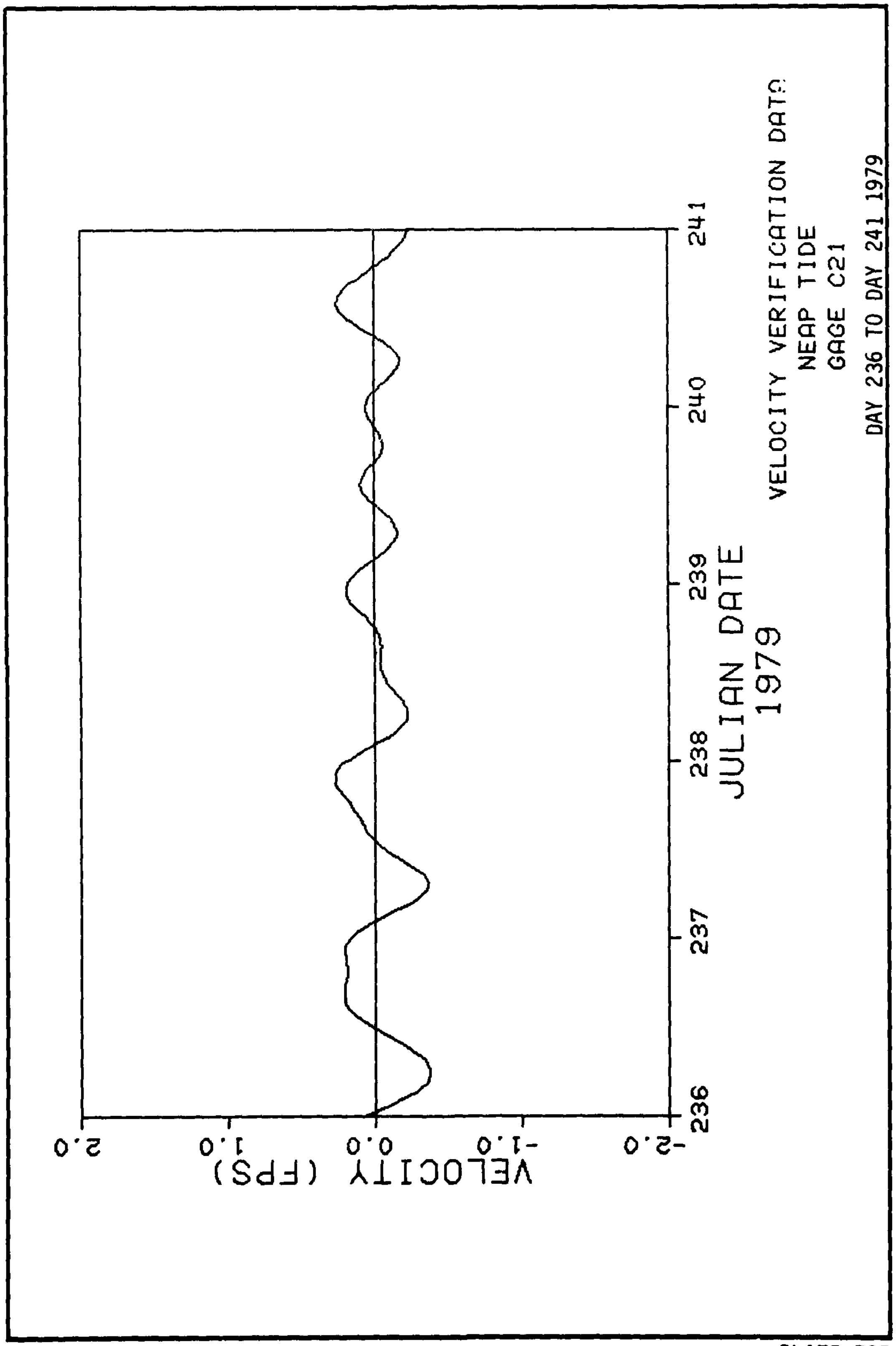
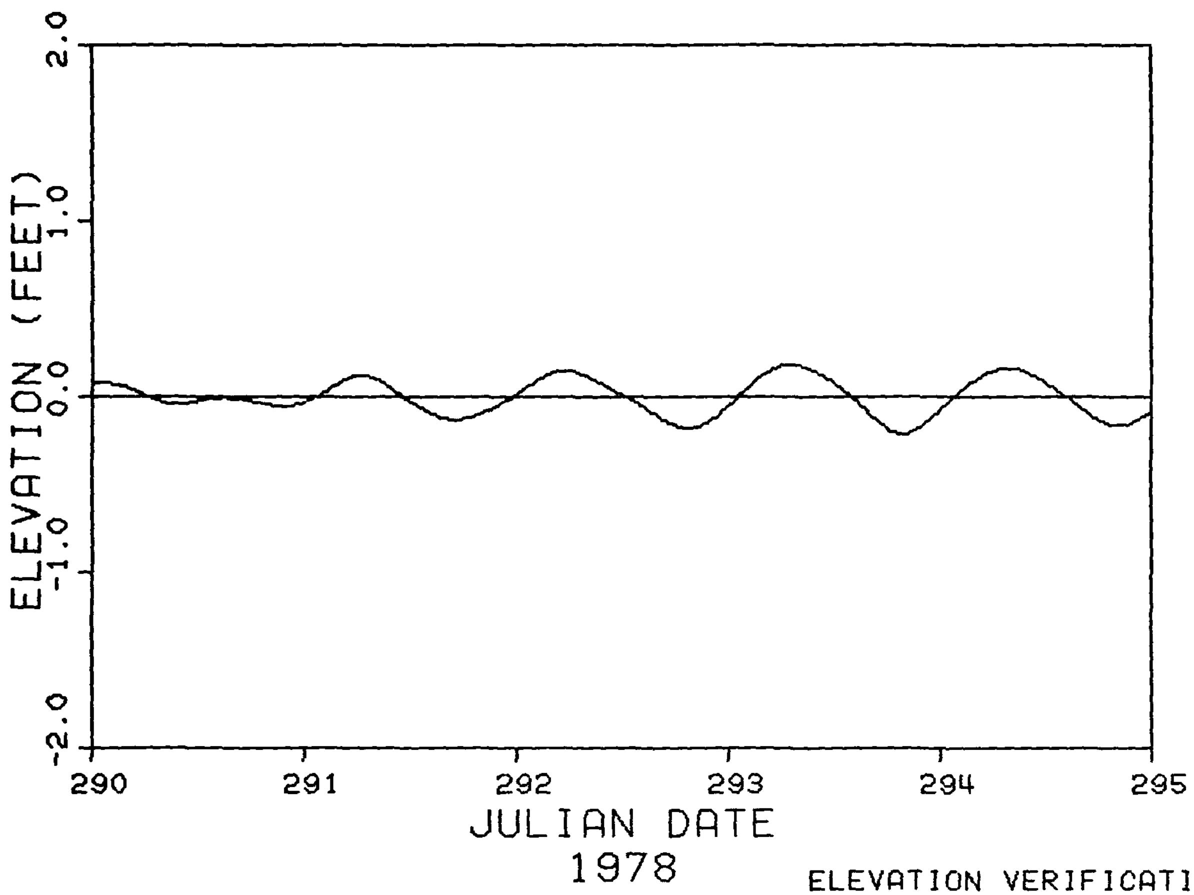
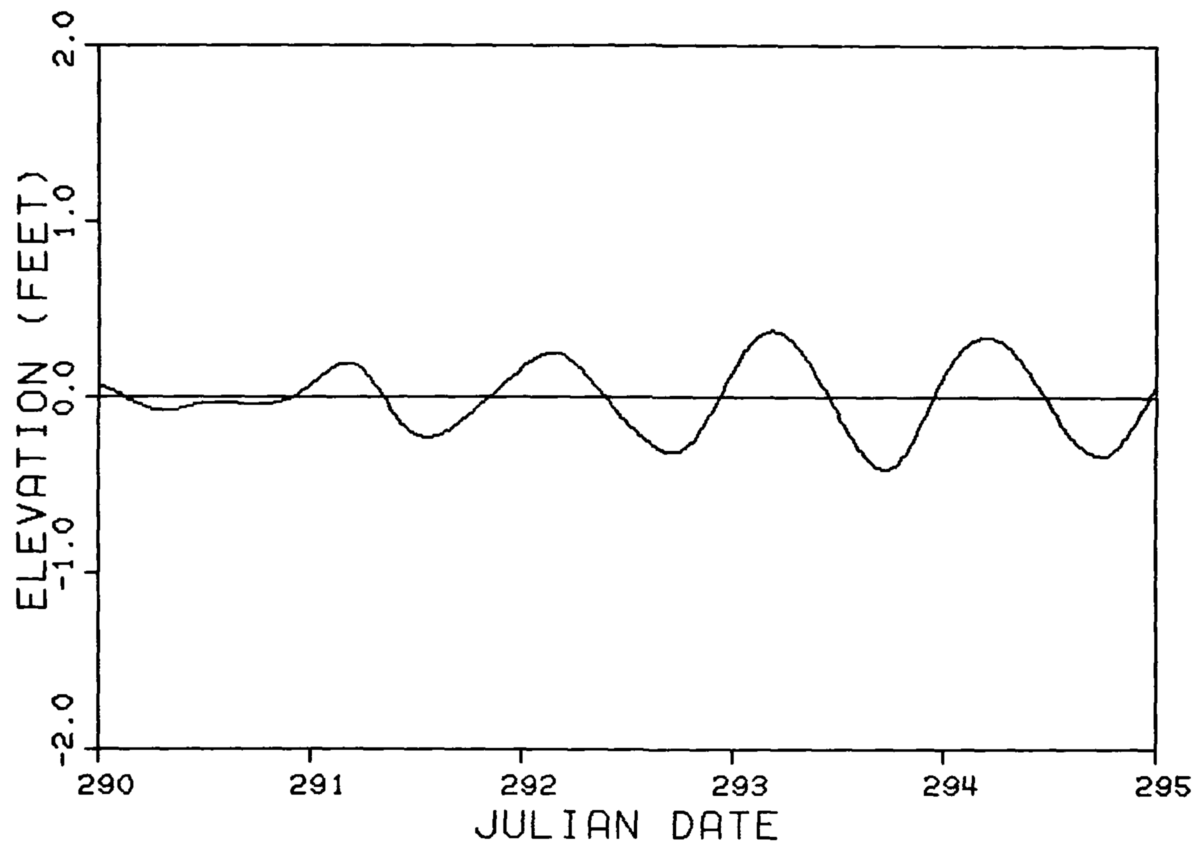

VELOCITY VERIFICATION DATA
NEAP TIDE
GAGE C21
DAY 236 TO DAY 241 1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241
JULIAN DATE
1979

PLATE E85



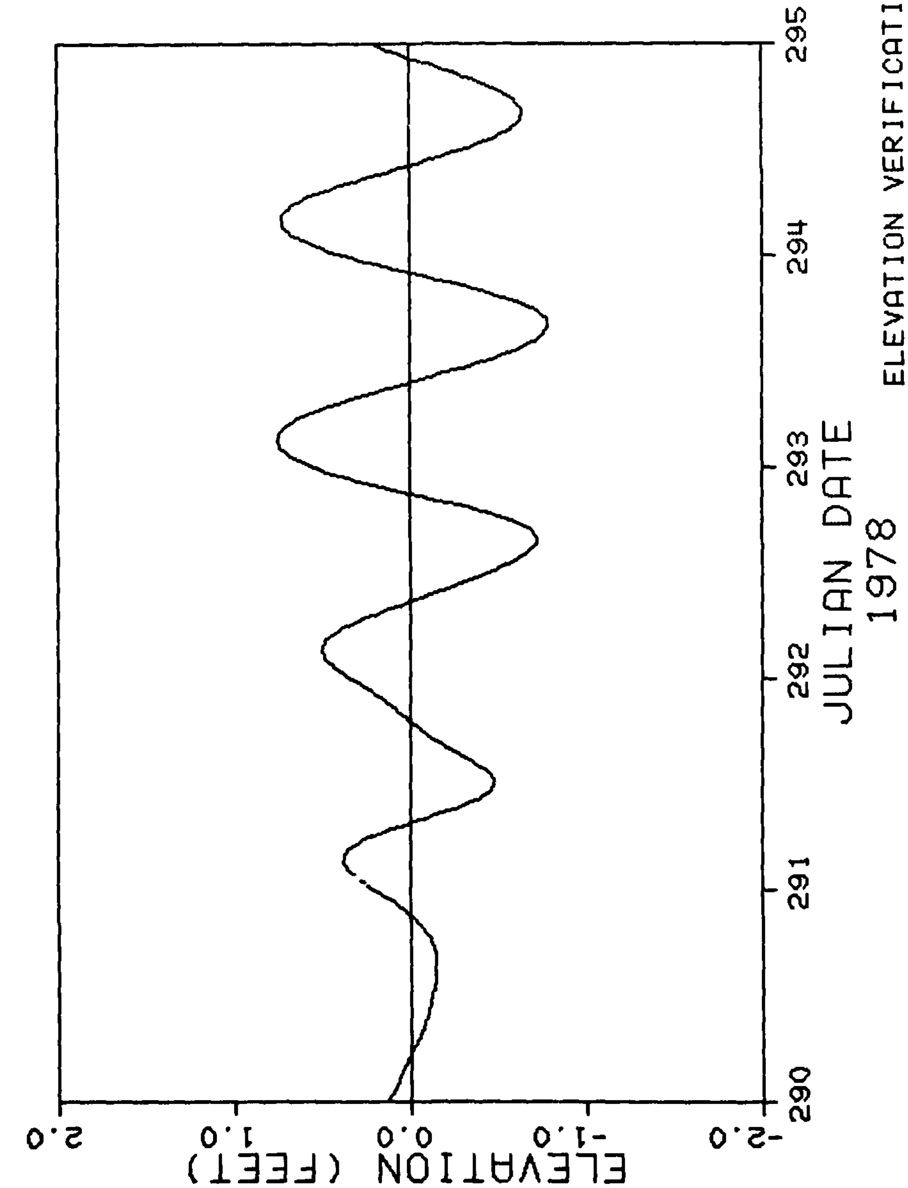
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE LMN 85675
DAY 290 TO DAY 295 1978



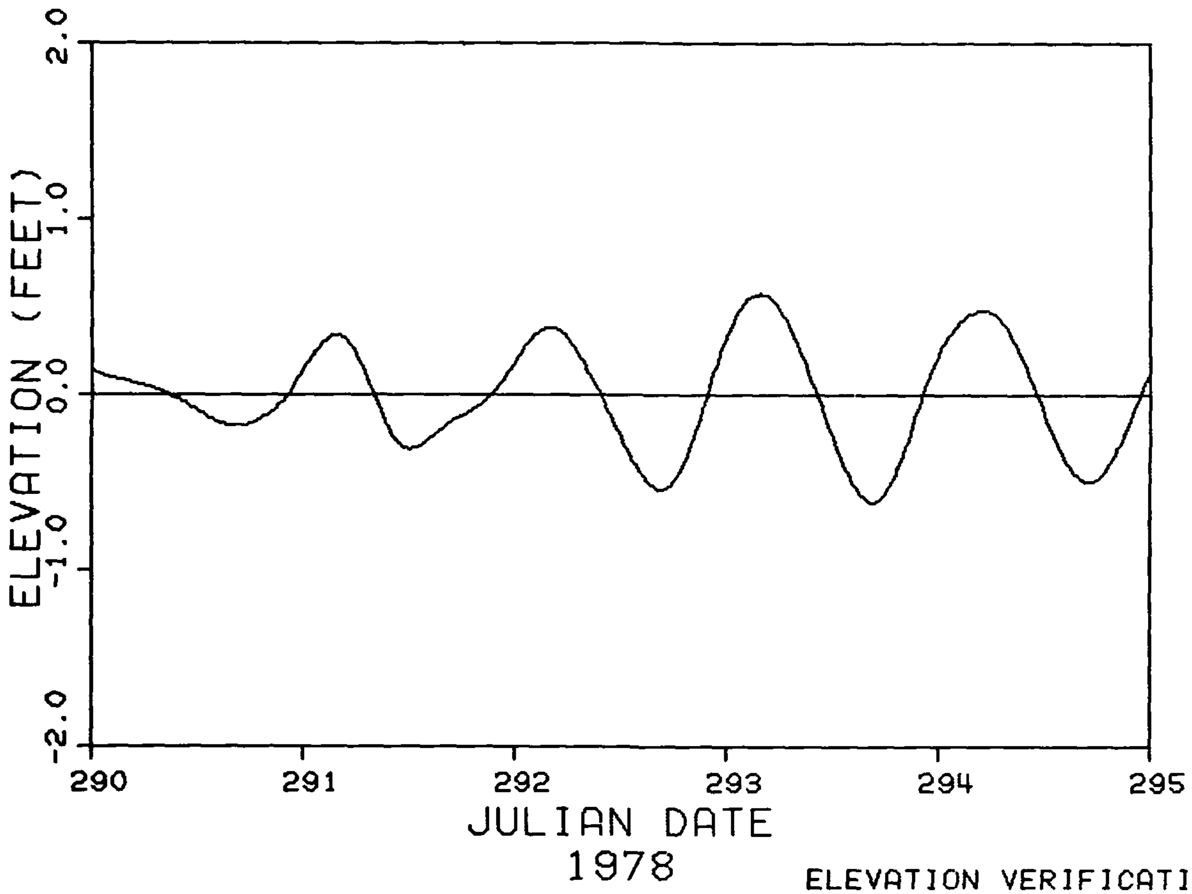
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE LMN 85700
DAY 290 TO DAY 295 1978



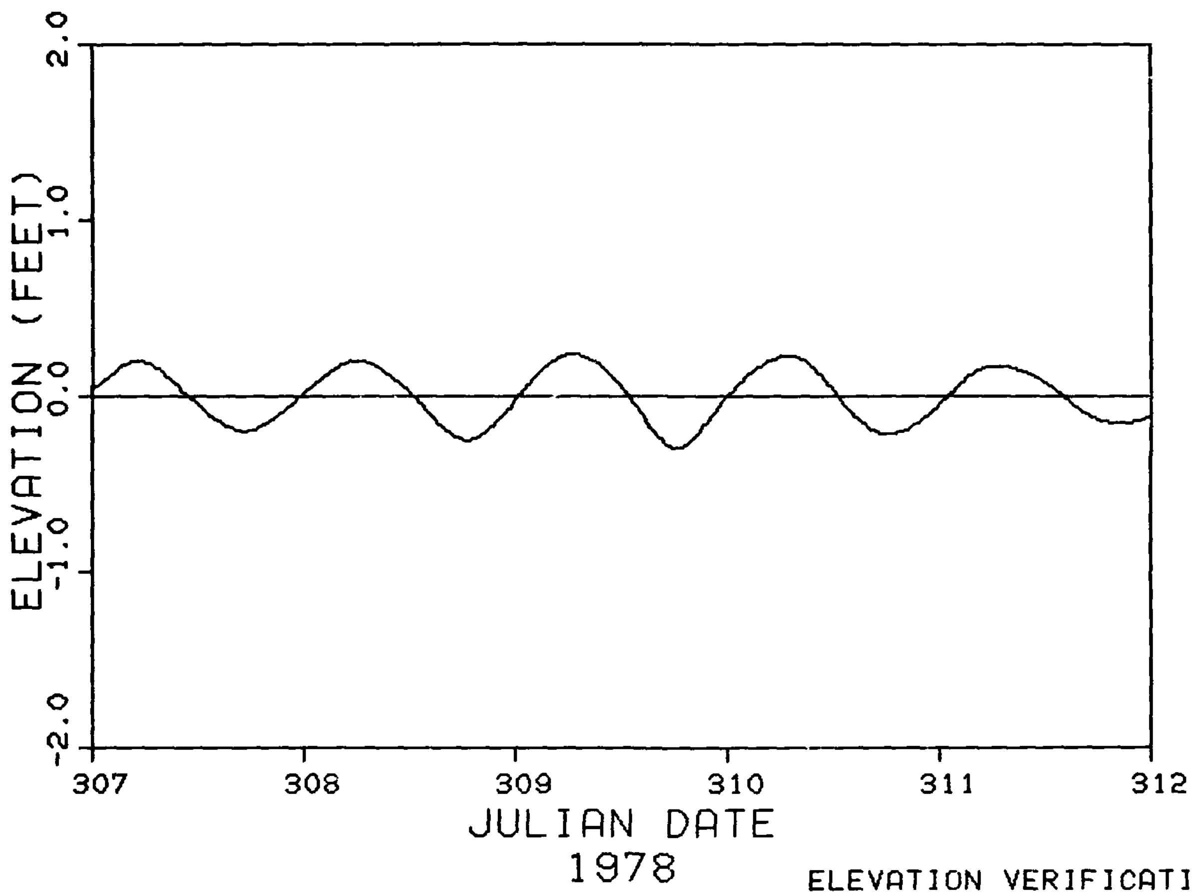
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE LMN 85725
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



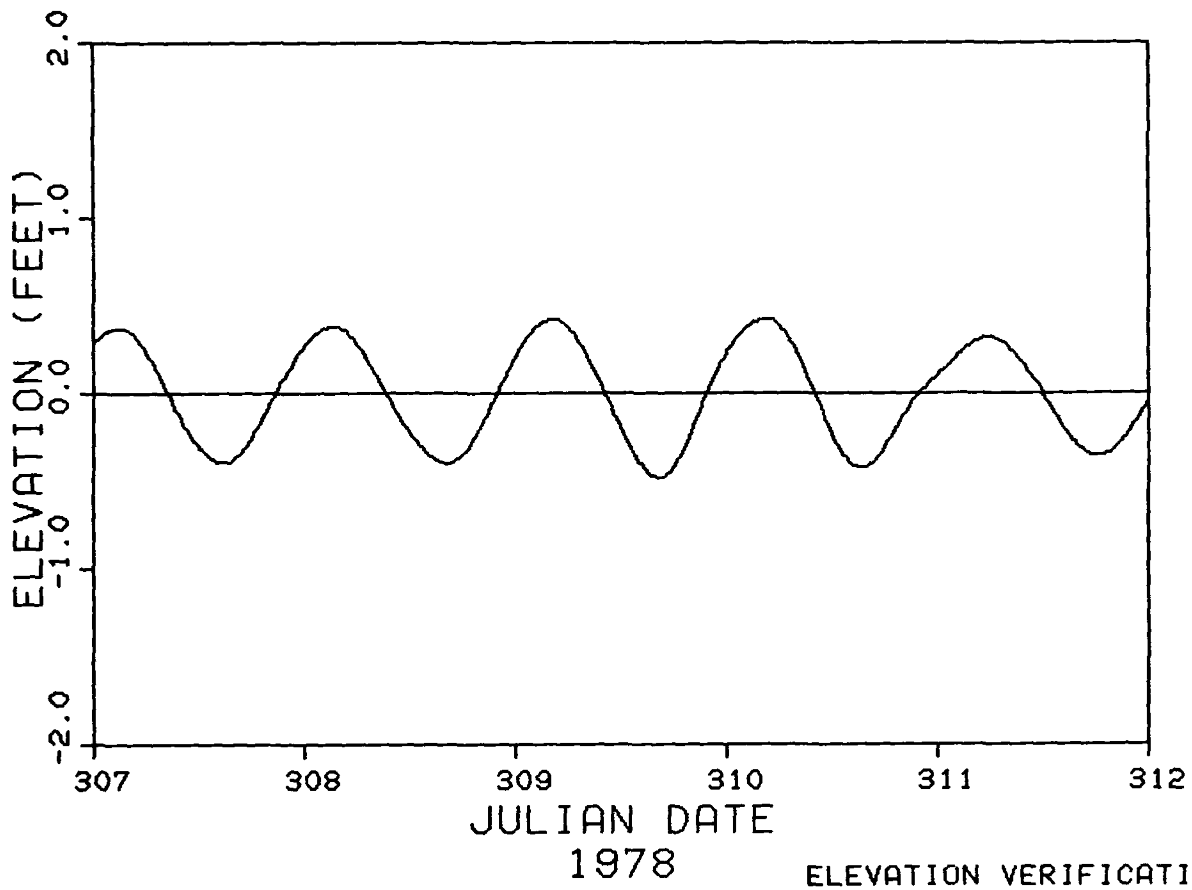
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE LMN 85750
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

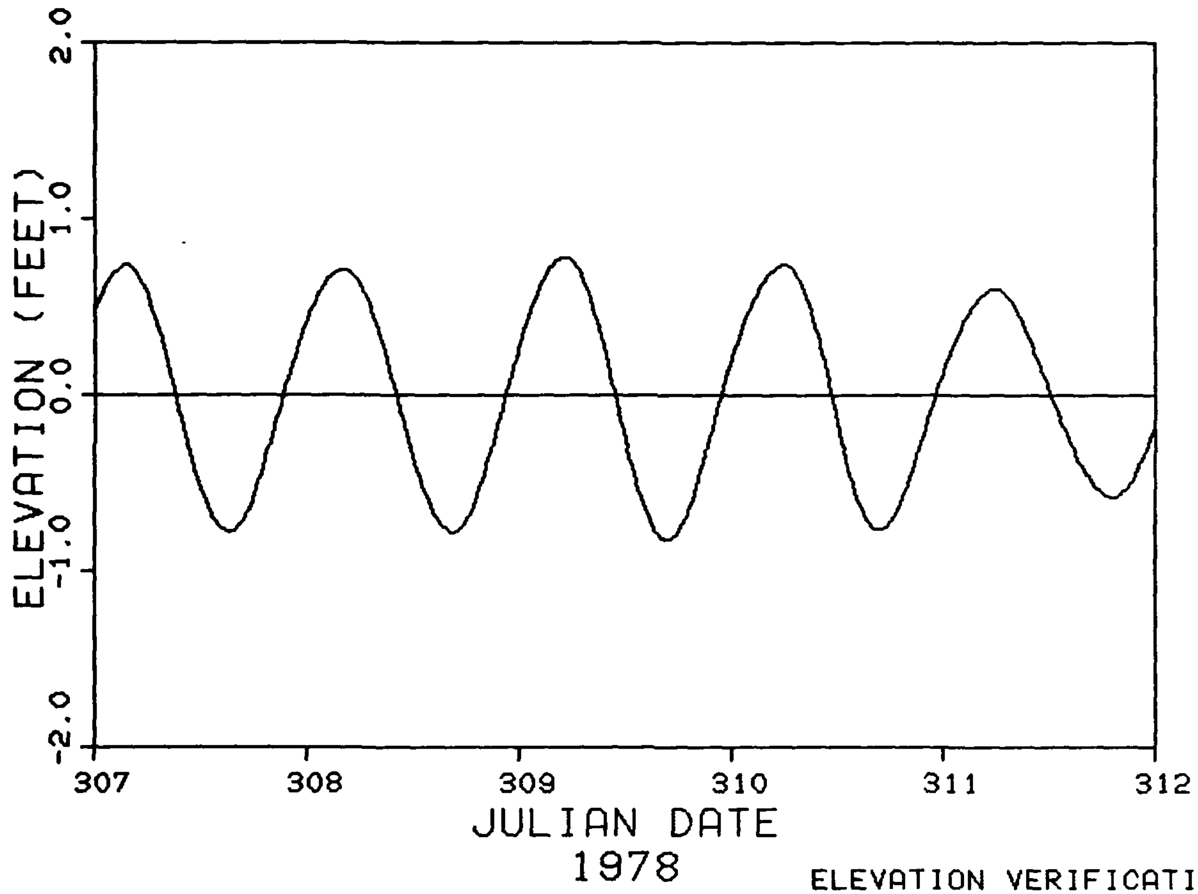
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE LMN 85675
DAY 307 TO DAY 312 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE LMN 85700

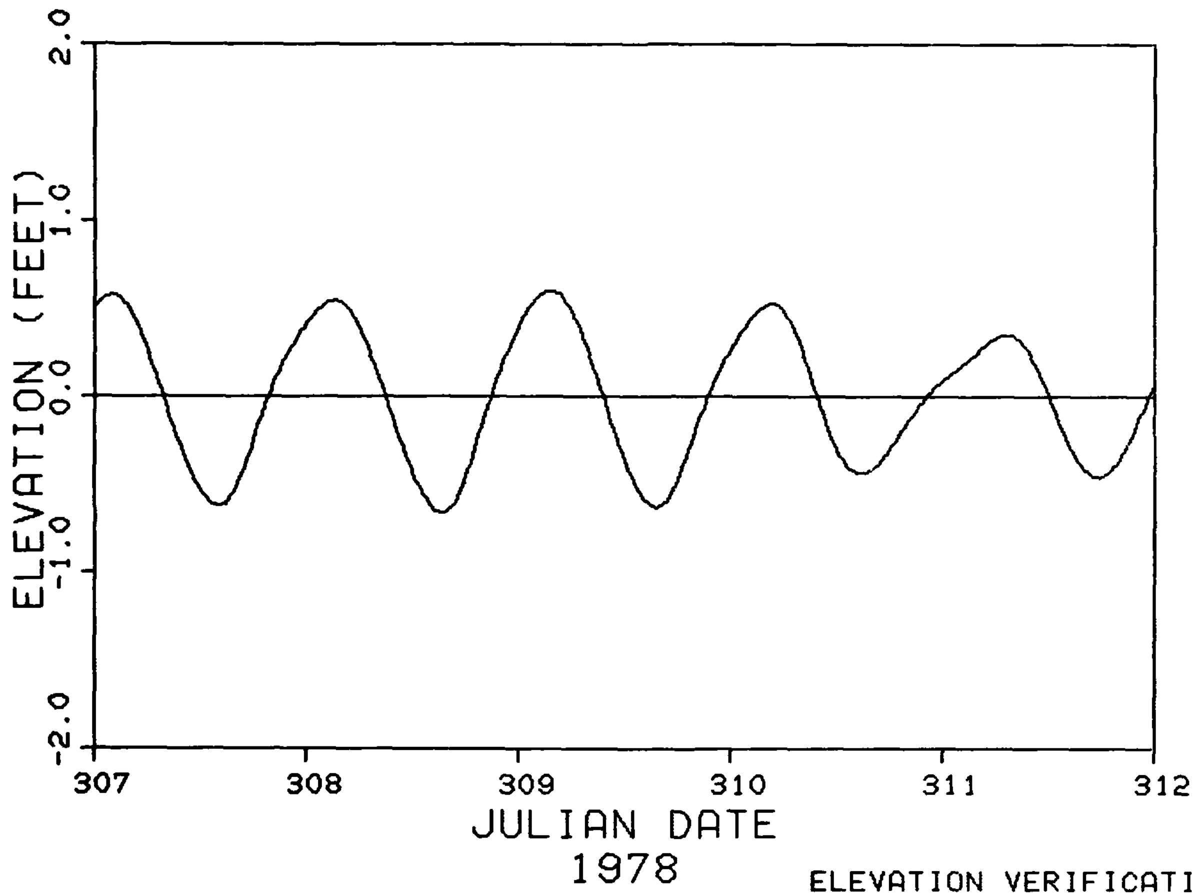
DAY 307 TO DAY 312 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

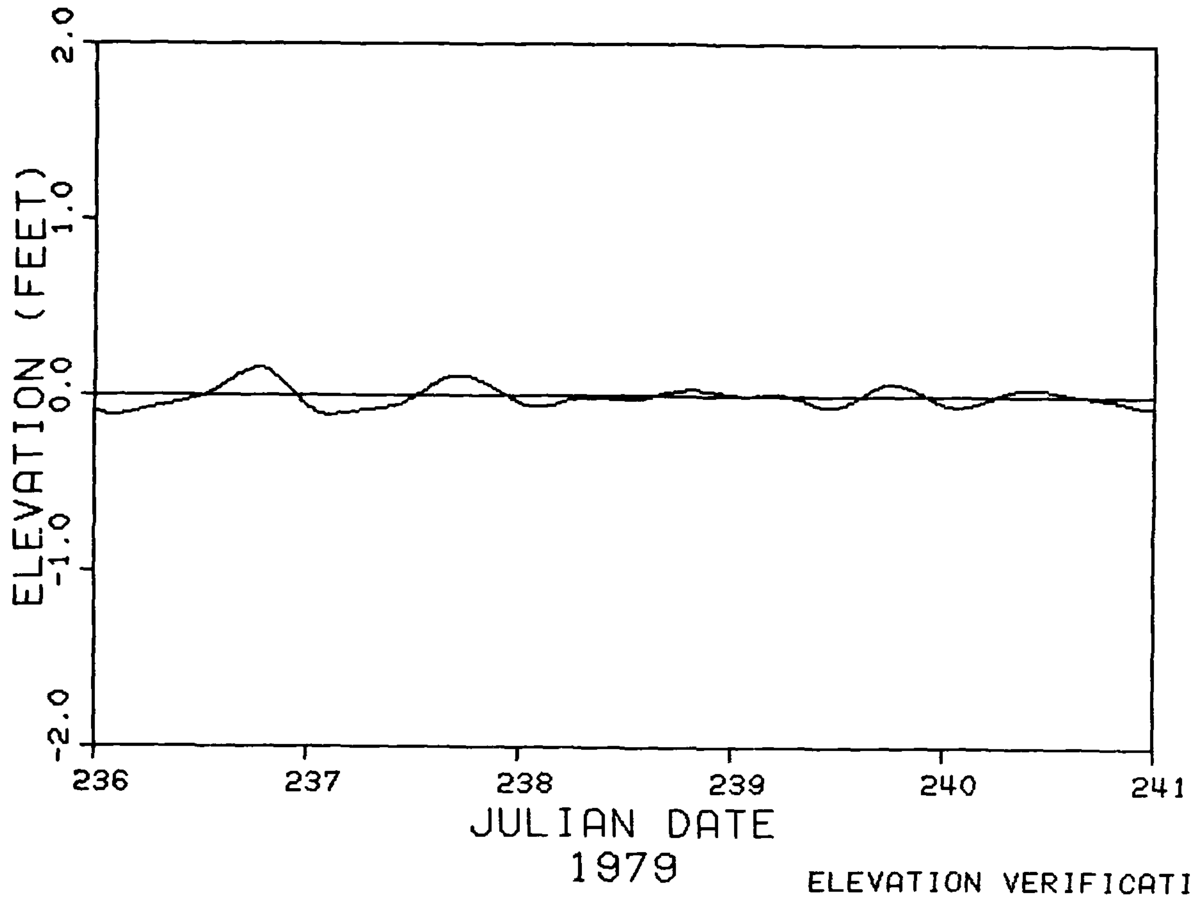
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE LMN 85725
DAY 307 TO DAY 312 1978

PLATE E92



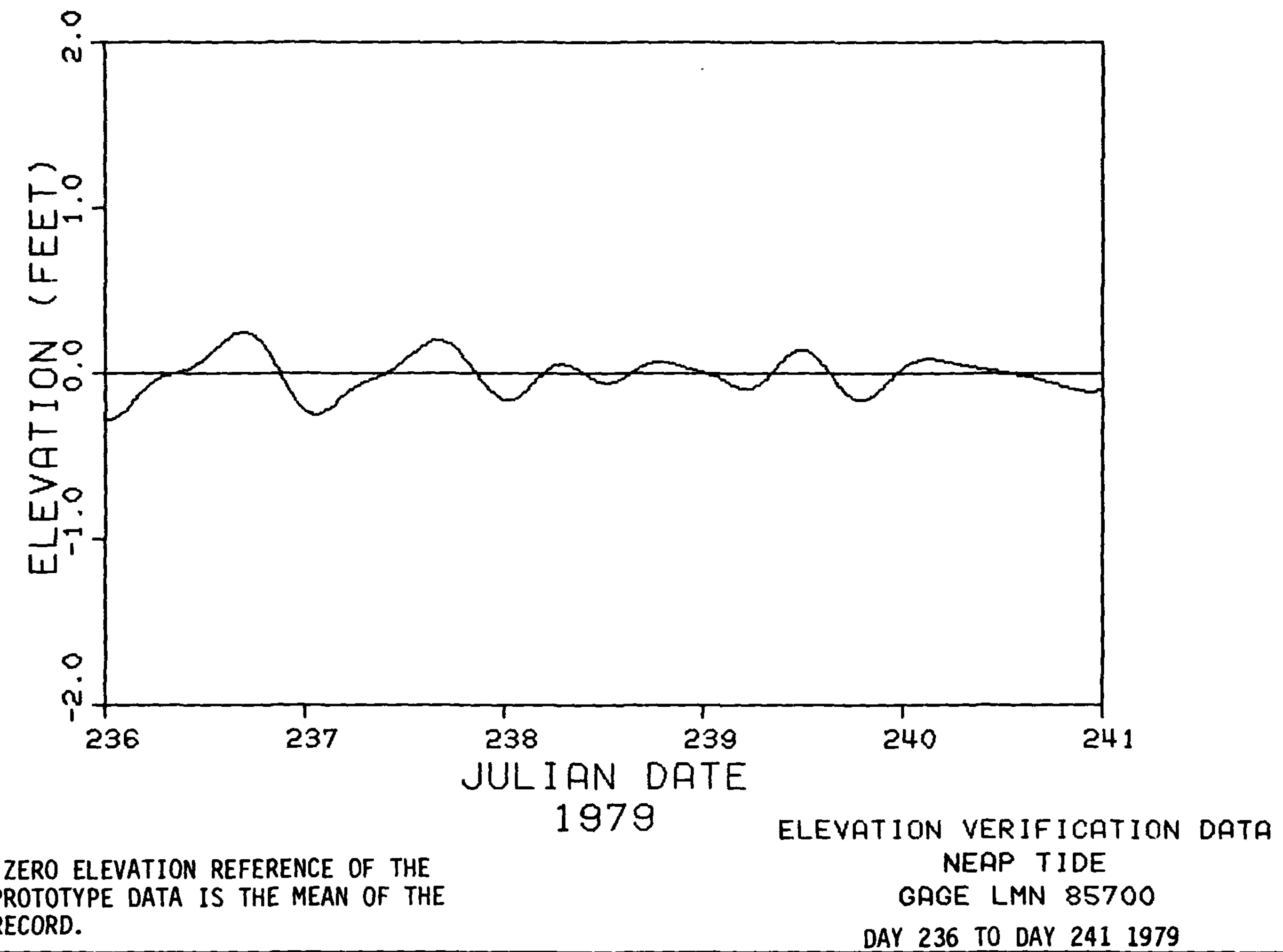
ELEVATION VERIFICATION DATA
SPRING TIDE
GAGE LMN 85750
DAY 307 TO DAY 312 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

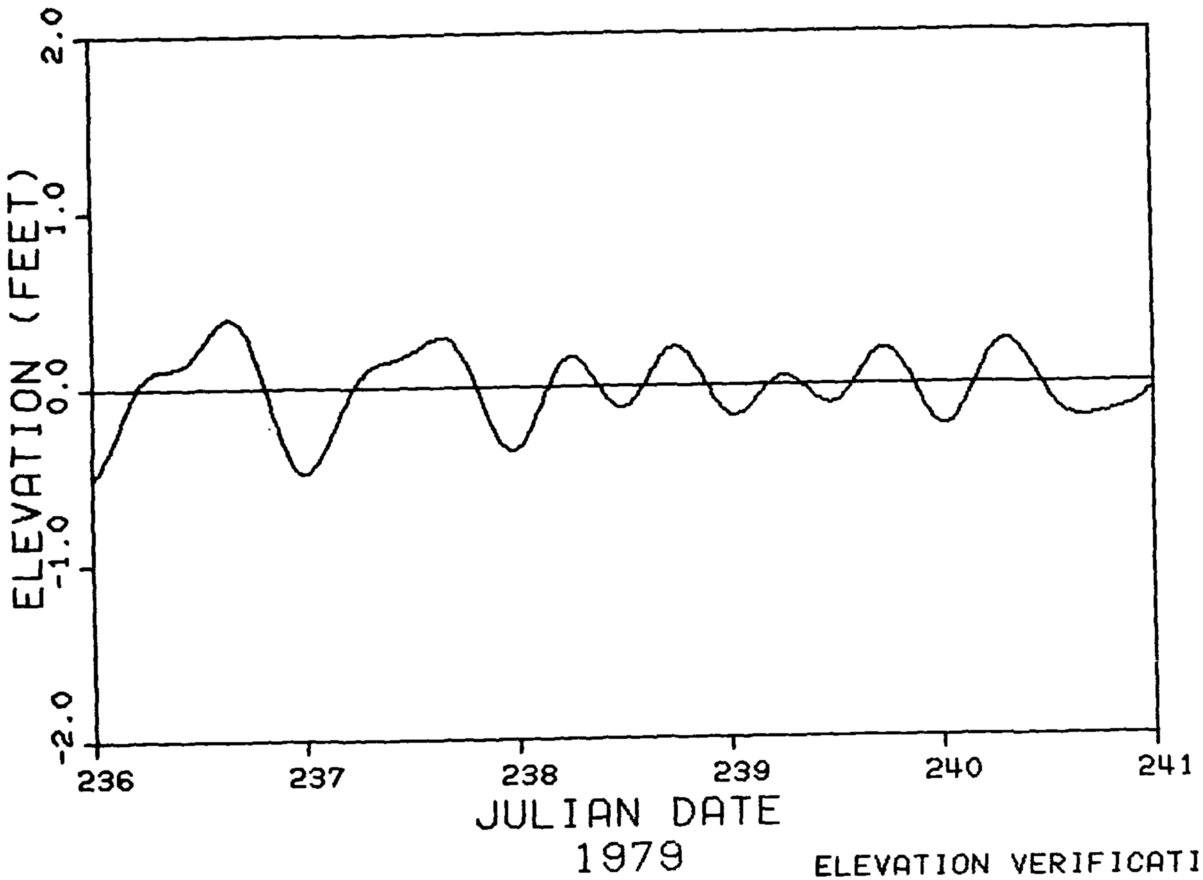


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE LMN 85675
DAY 236 TO DAY 241 1979



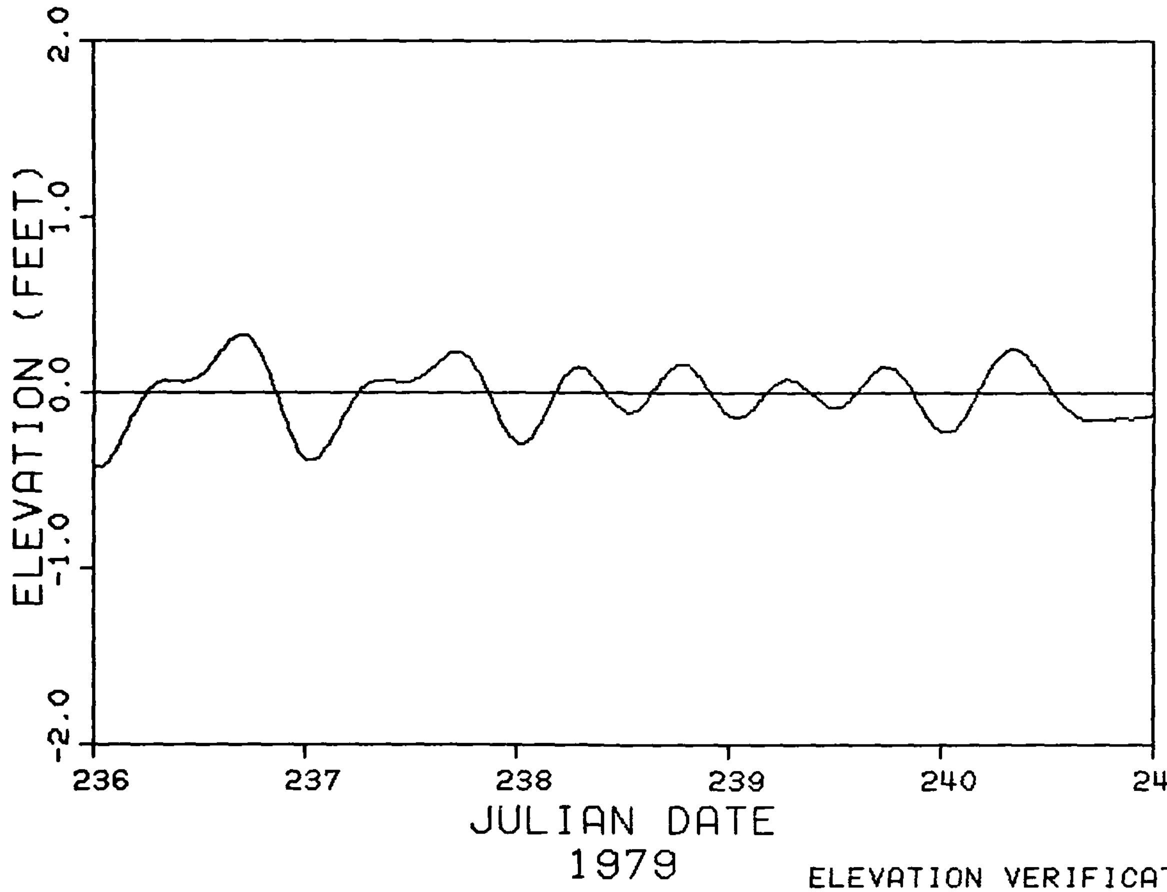
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE LMN 85725

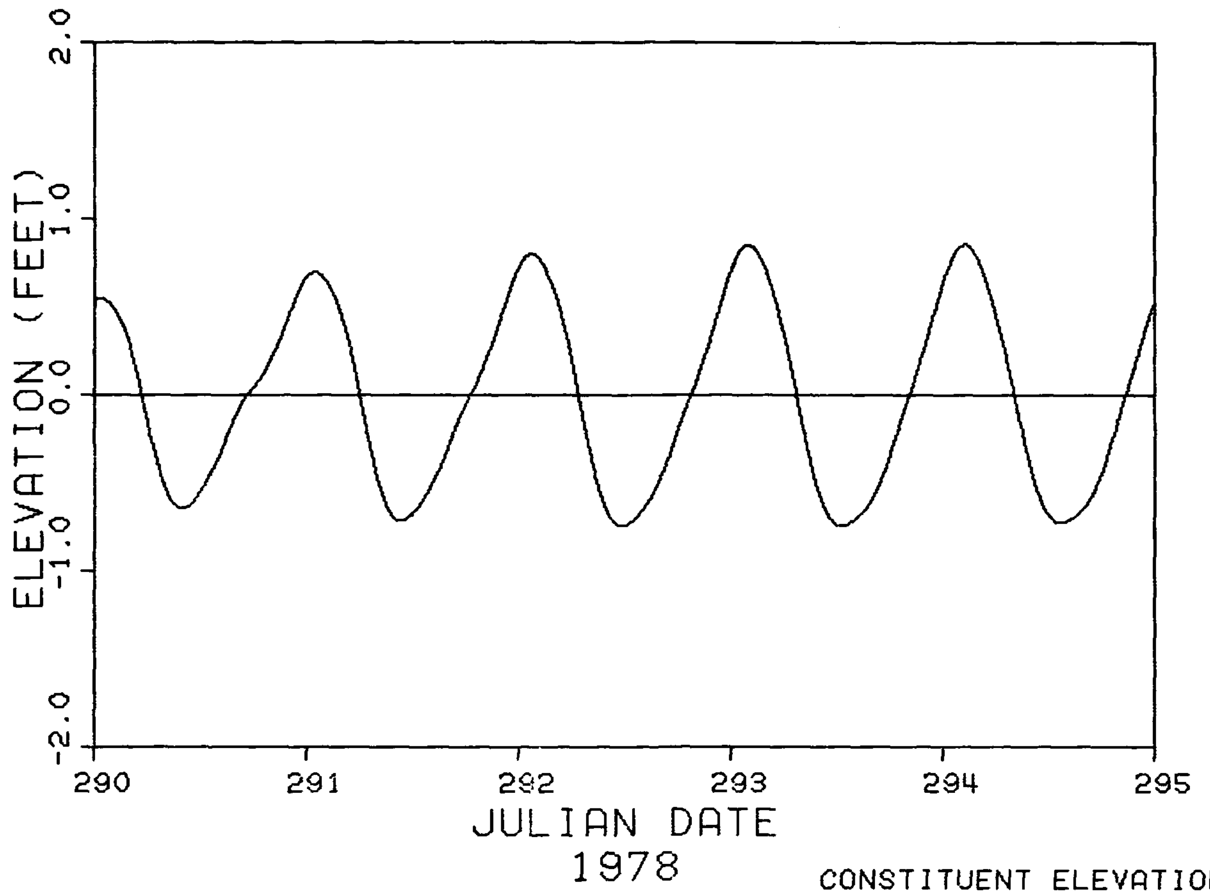
DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



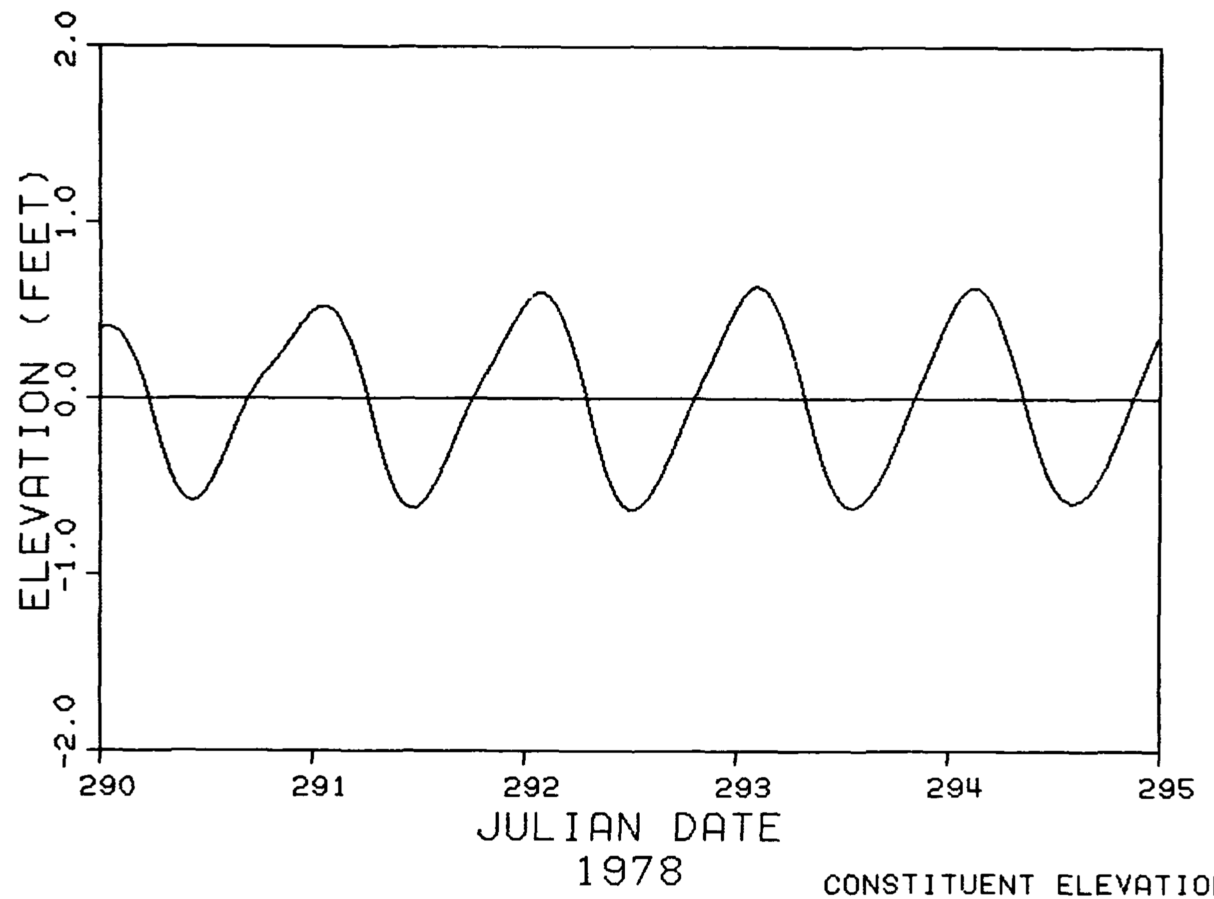
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

ELEVATION VERIFICATION DATA
NEAP TIDE
GAGE LMN 85750
DAY 236 TO DAY 241 1979



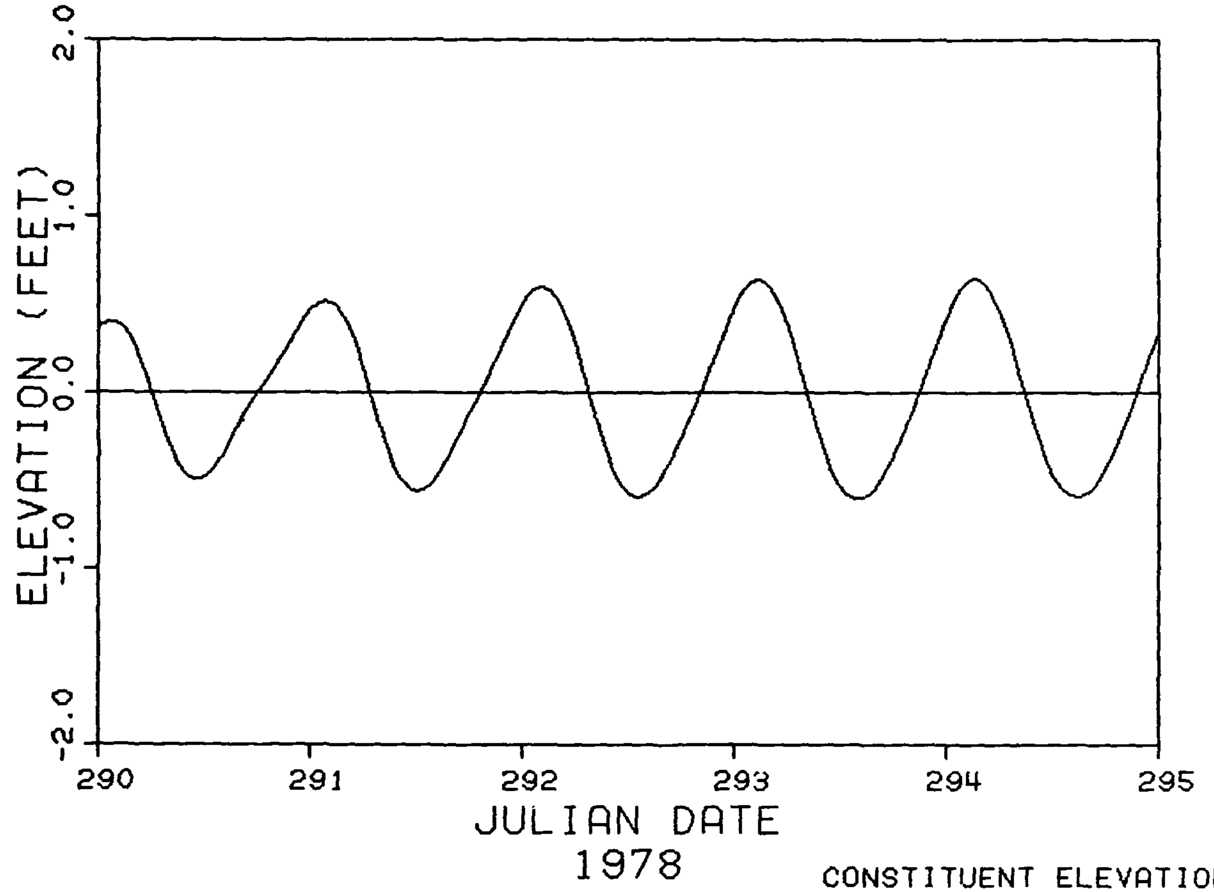
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-1
DAY 290 TO DAY 295 1978



CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-2
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

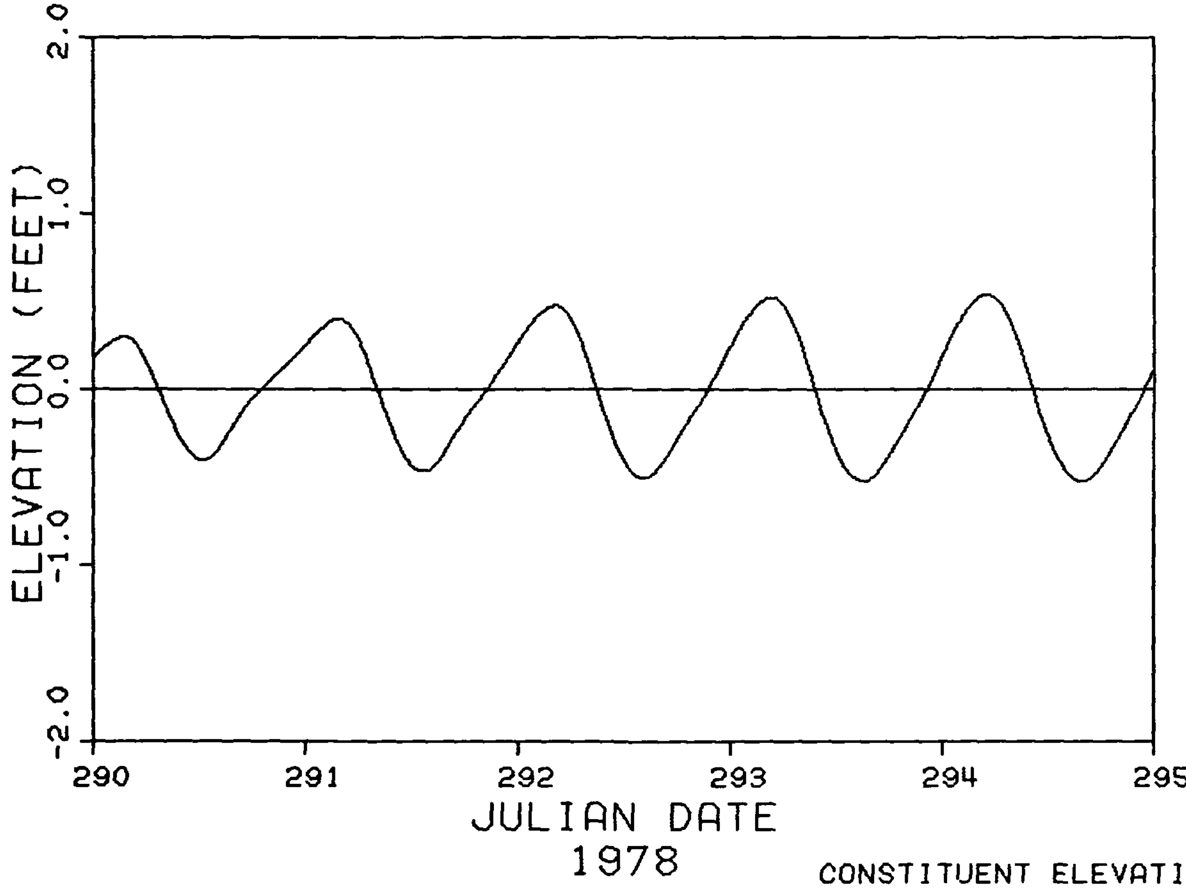


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-3

DAY 290 TO DAY 295 1978

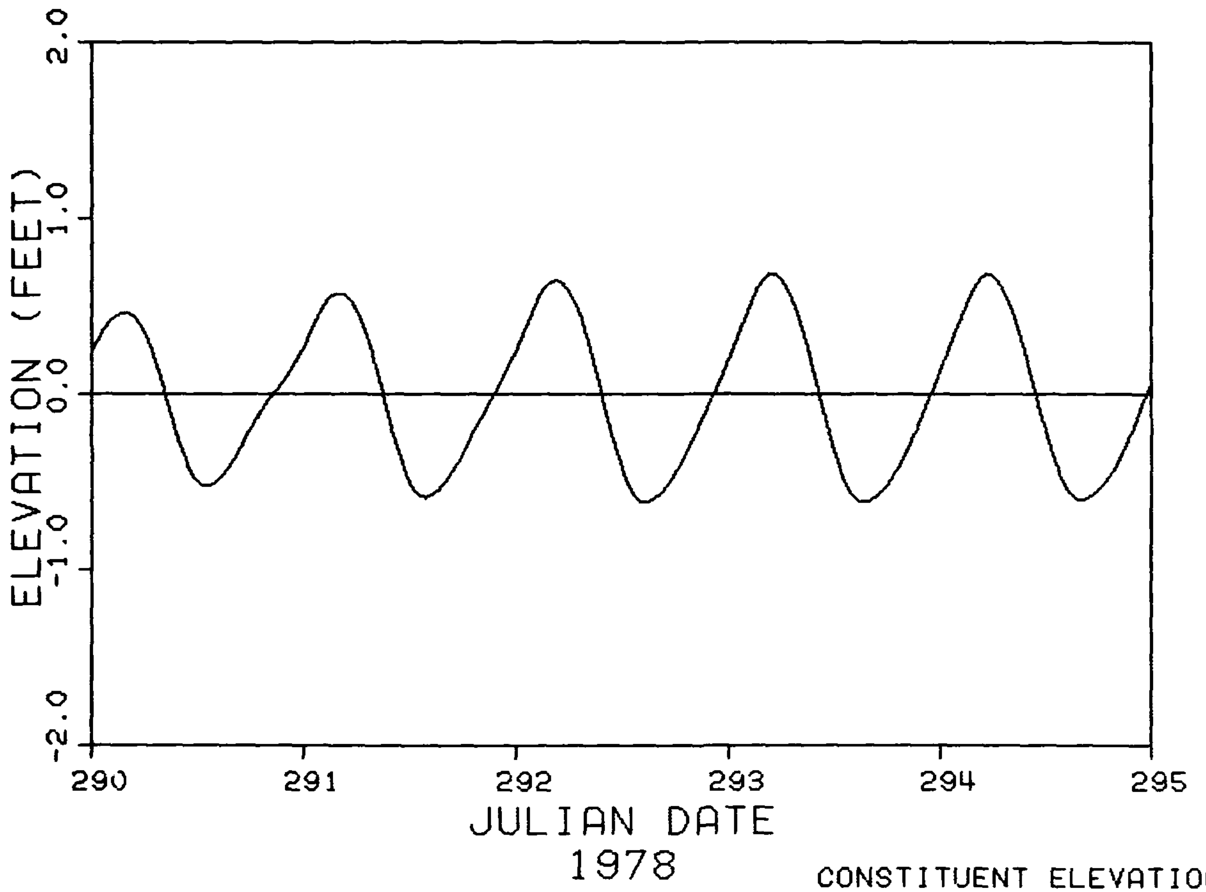
PLATE E100



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

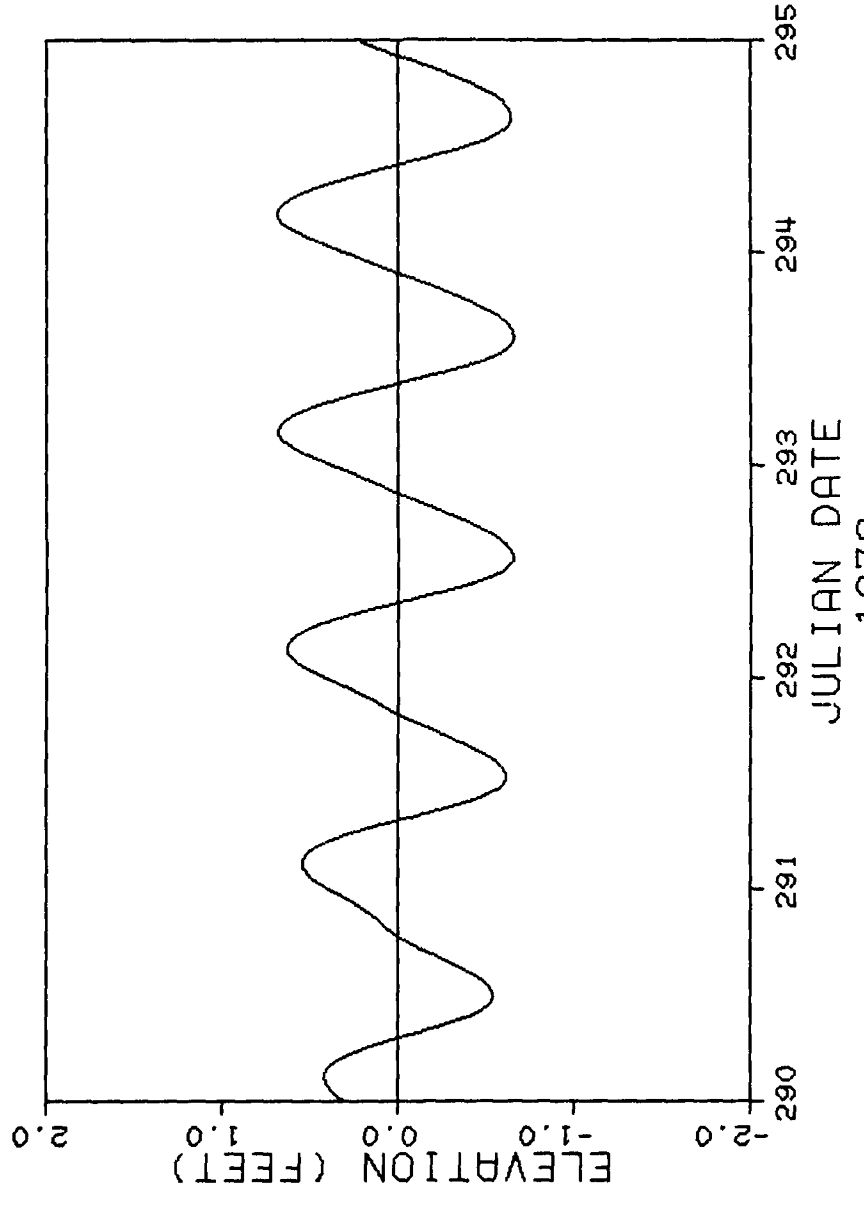
CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-4

DAY 290 TO DAY 295 1978



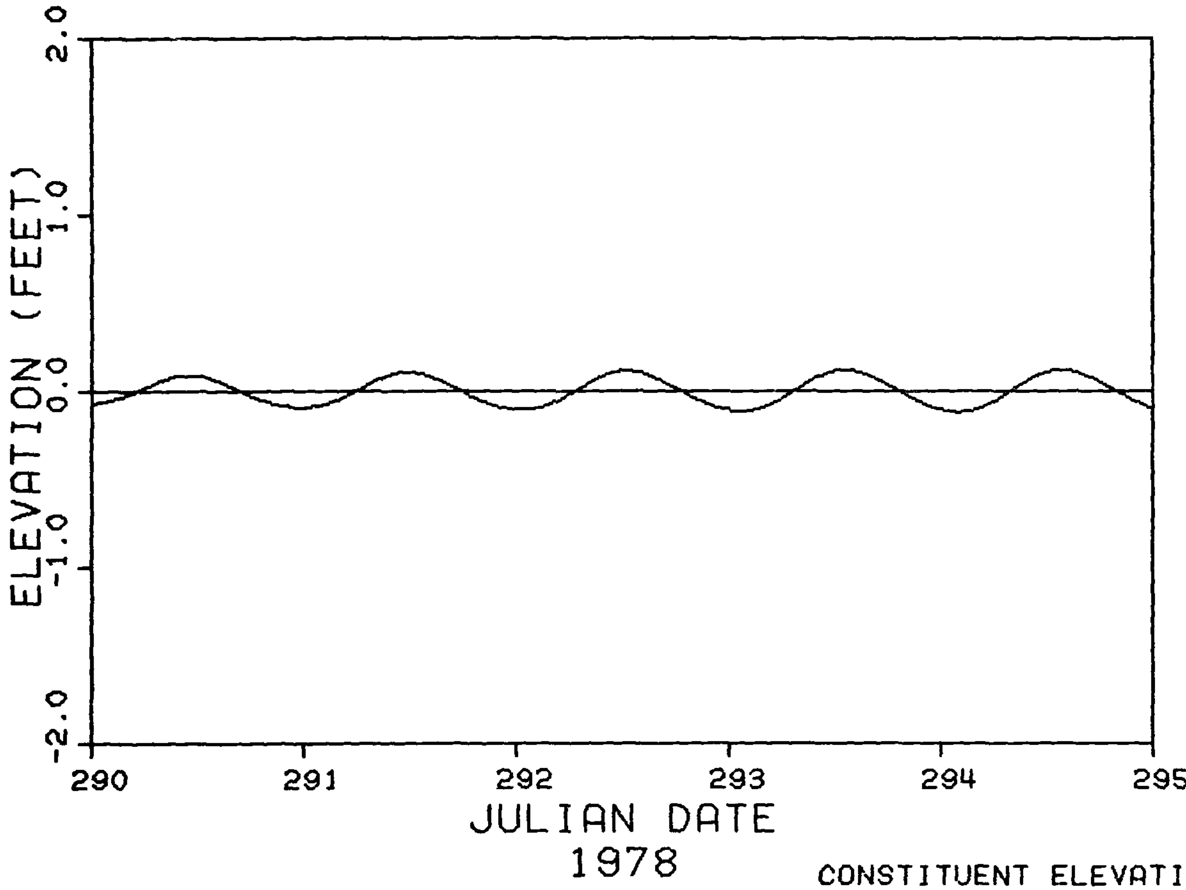
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-5
DAY 290 TO DAY 295 1978



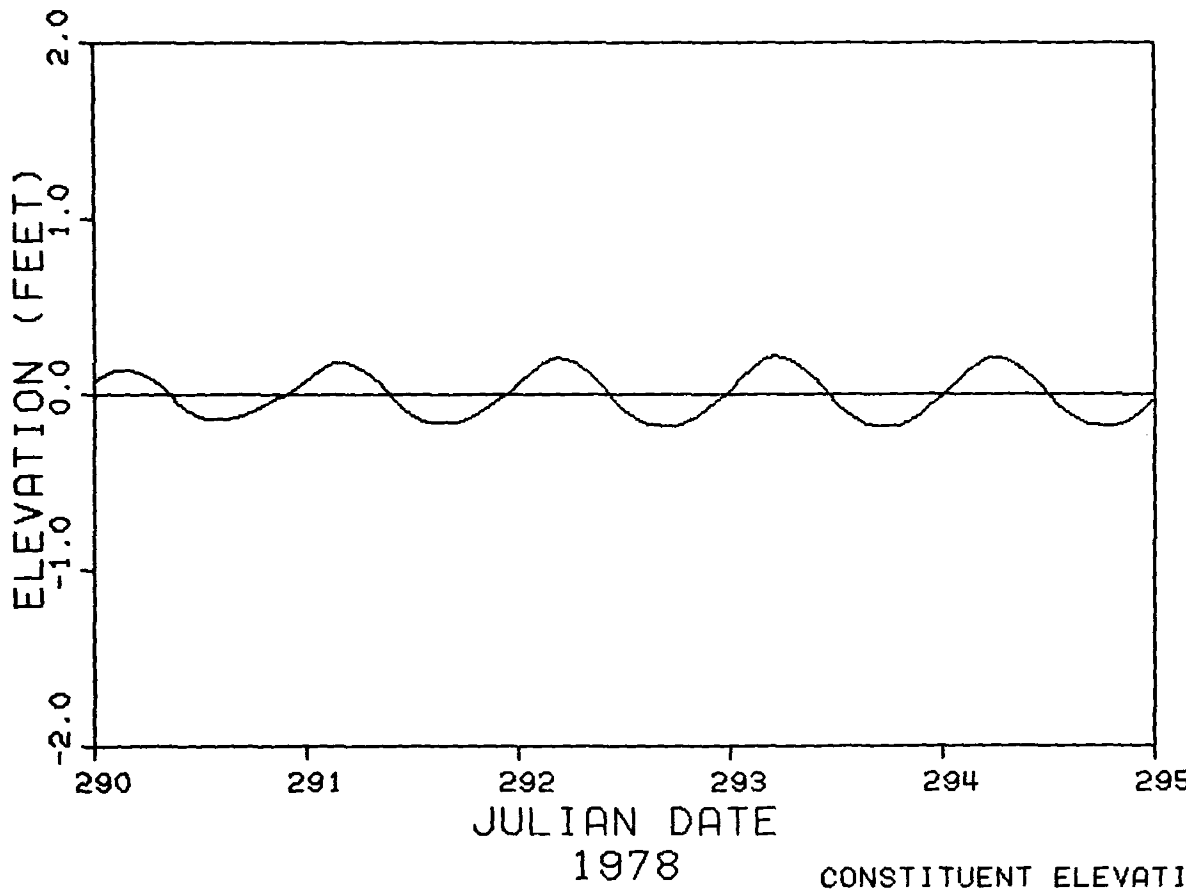
CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-6
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

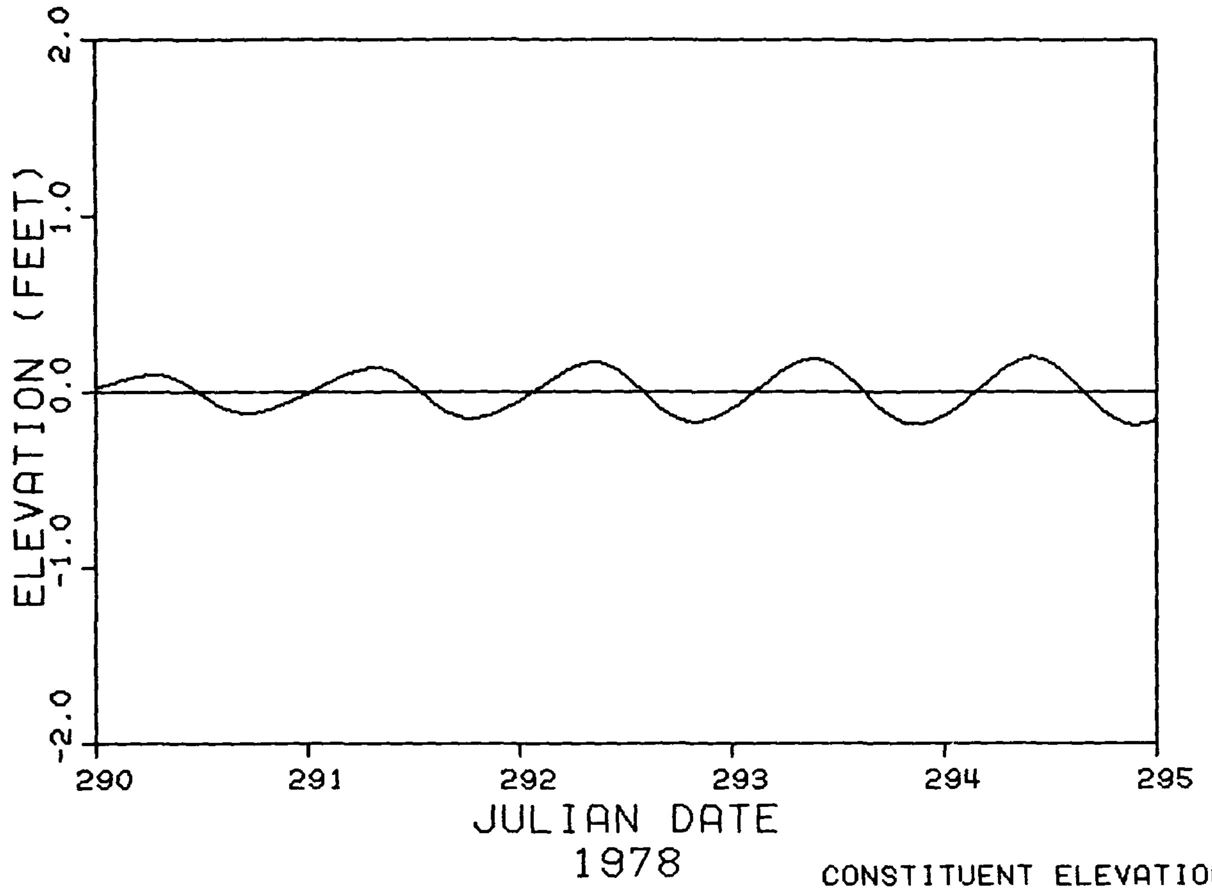
CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE M-1
DAY 290 TO DAY 295 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

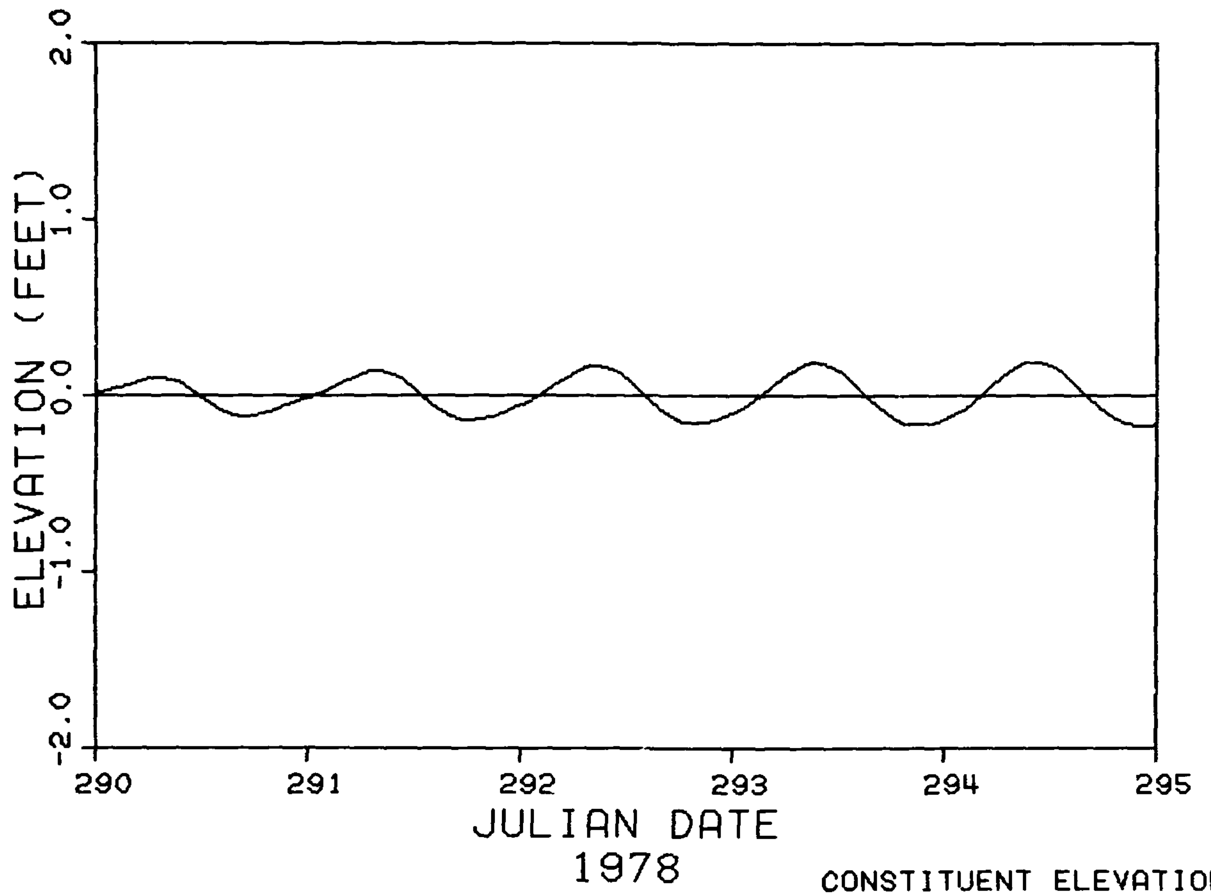
CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-1

DAY 290 TO DAY 295 1978



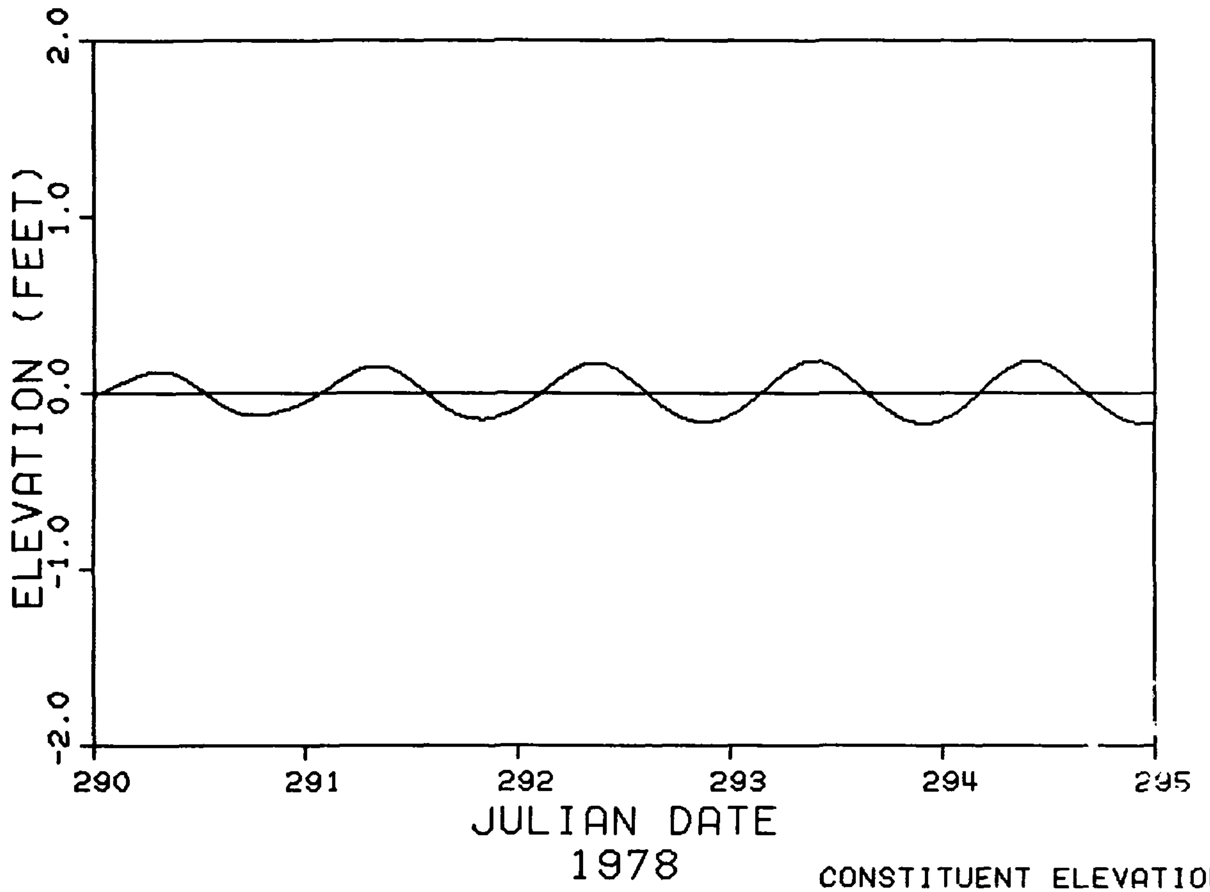
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-2
DAY 290 TO DAY 295 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

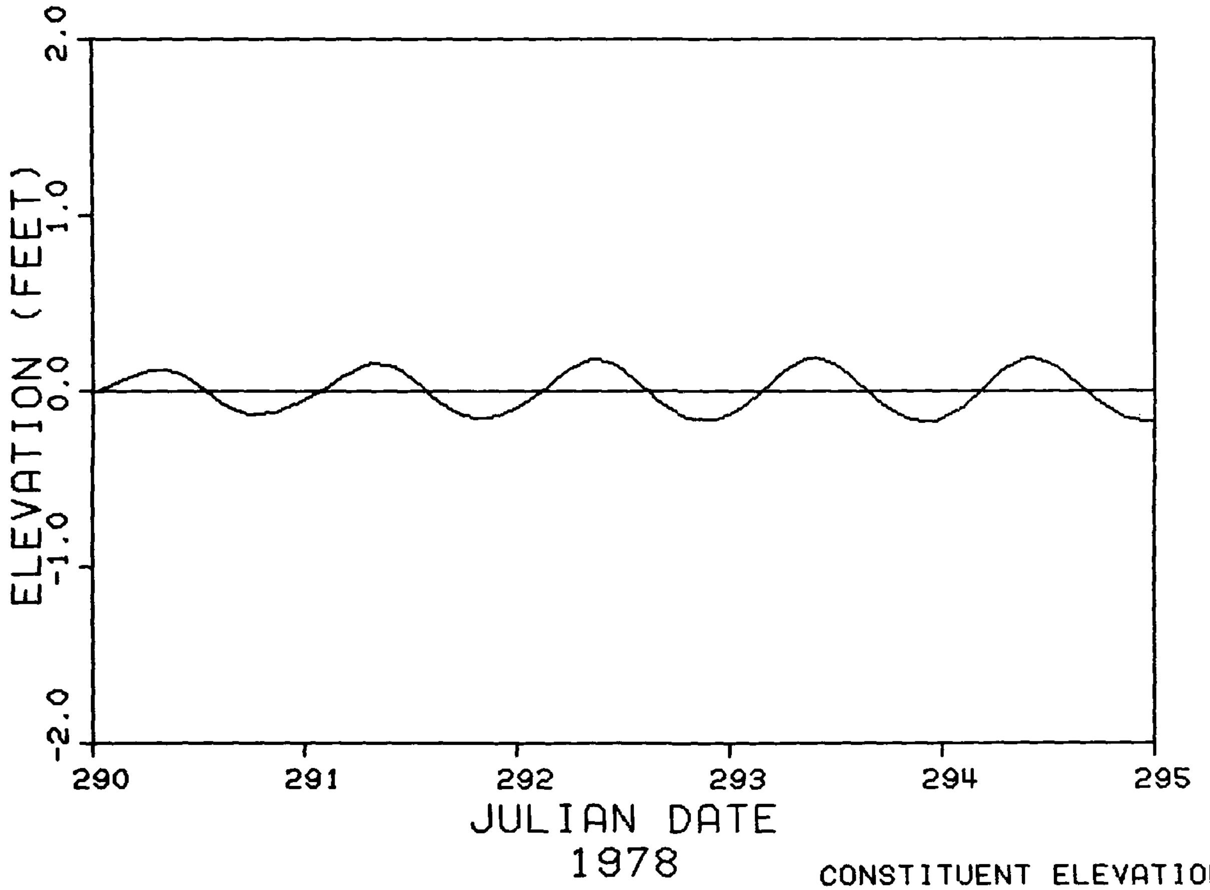
CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-3
DAY 290 TO DAY 295 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-4

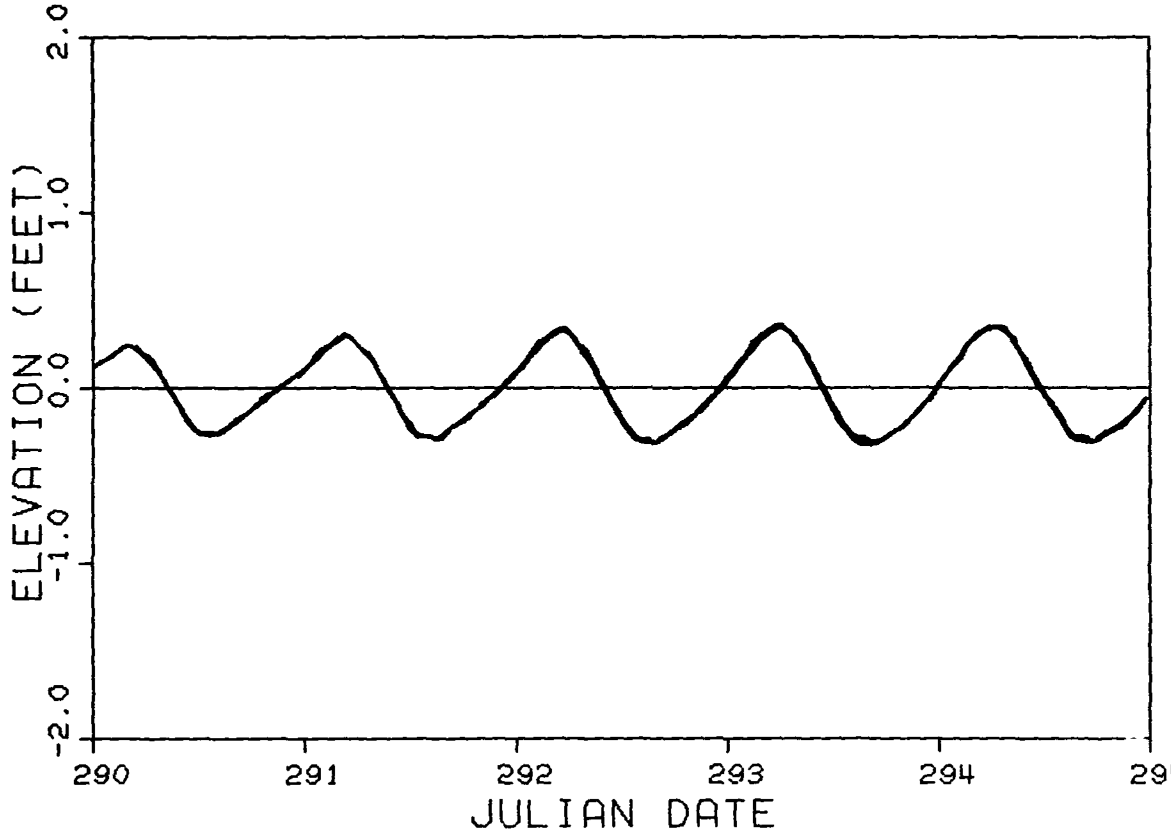
DAY 290 TO DAY 295 1978



CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-5

DAY 290 TO DAY 295 1978

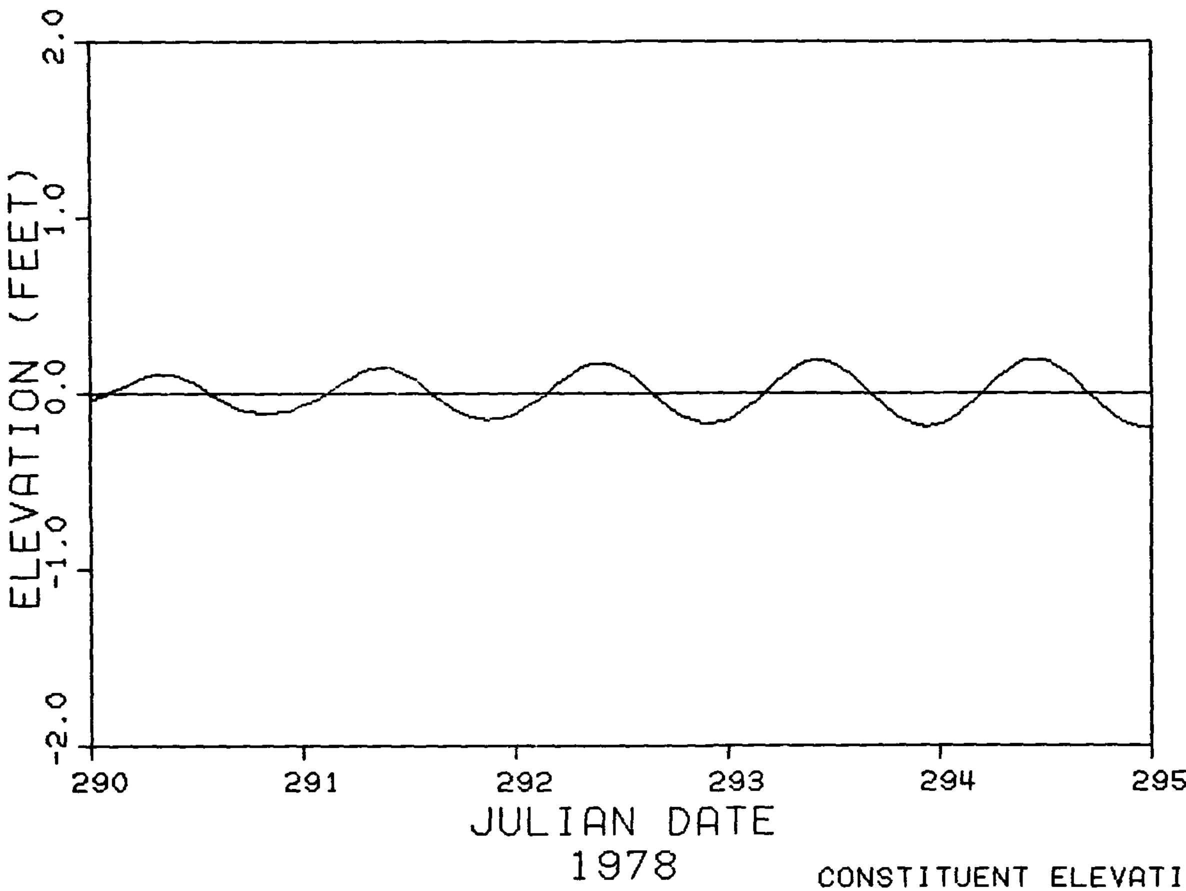
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-6

DAY 290 TO DAY 295 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-7

DAY 290 TO DAY 295 1978

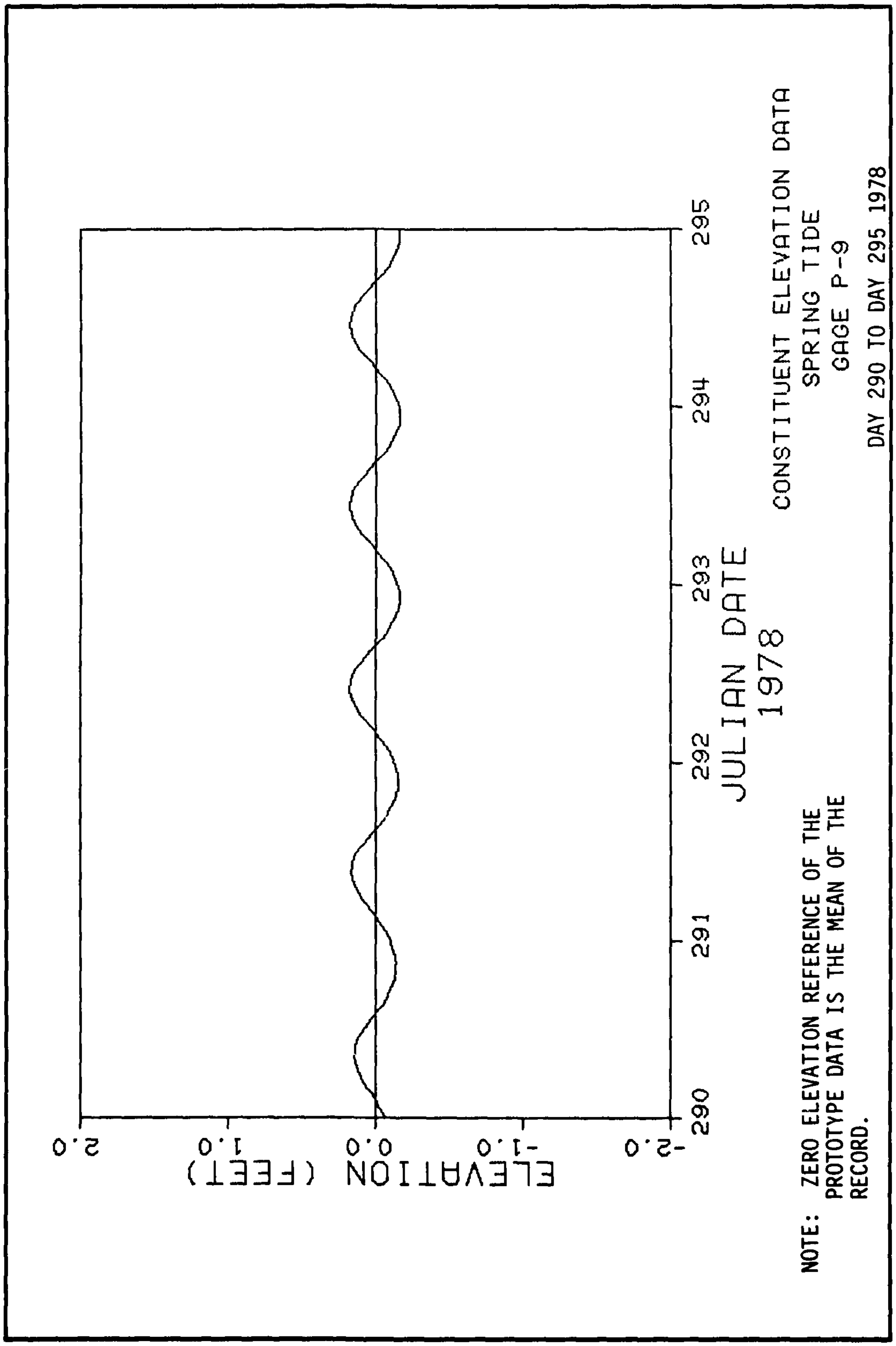
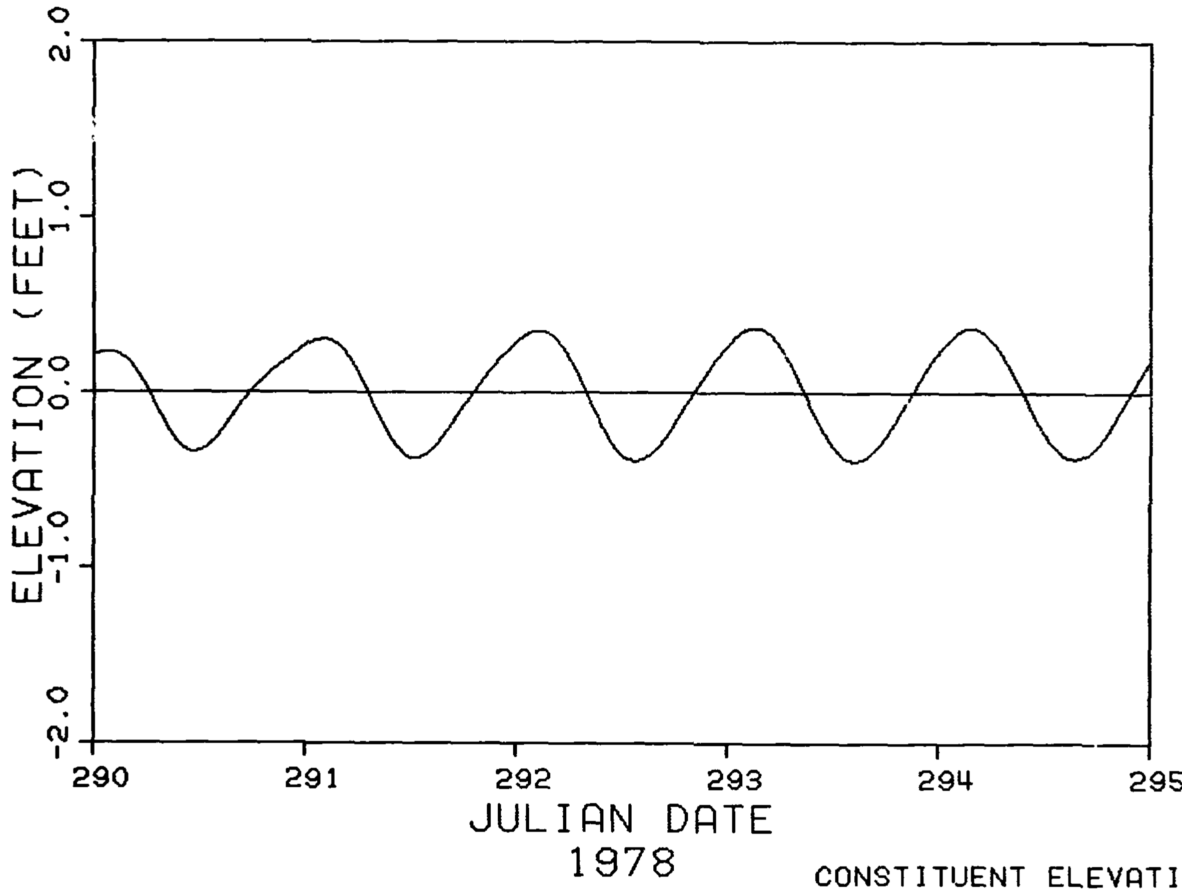
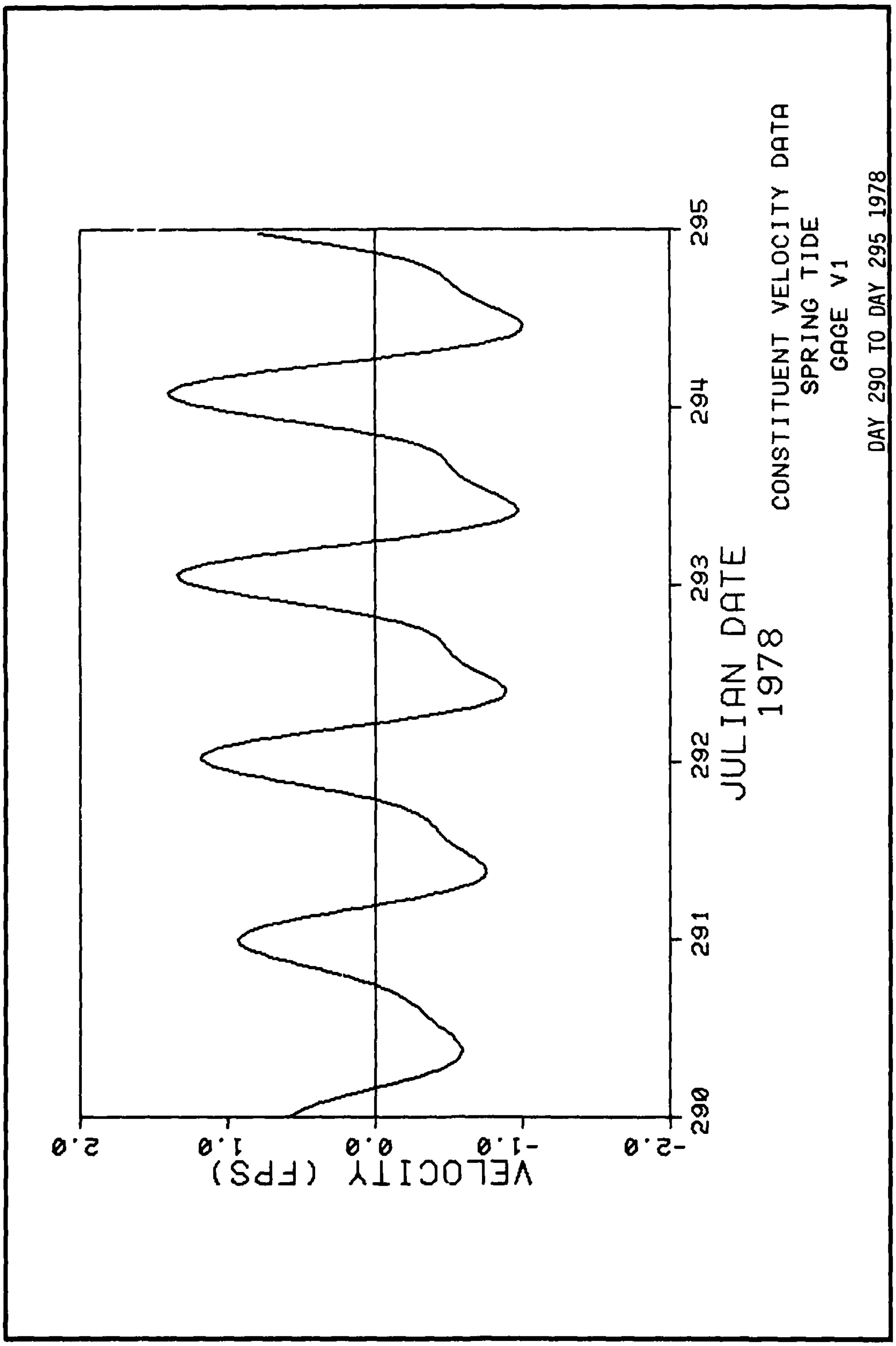

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-9
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
ELEVATION (FEET)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

PLATE E112



CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE R-1
DAY 290 TO DAY 295 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V1
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E114

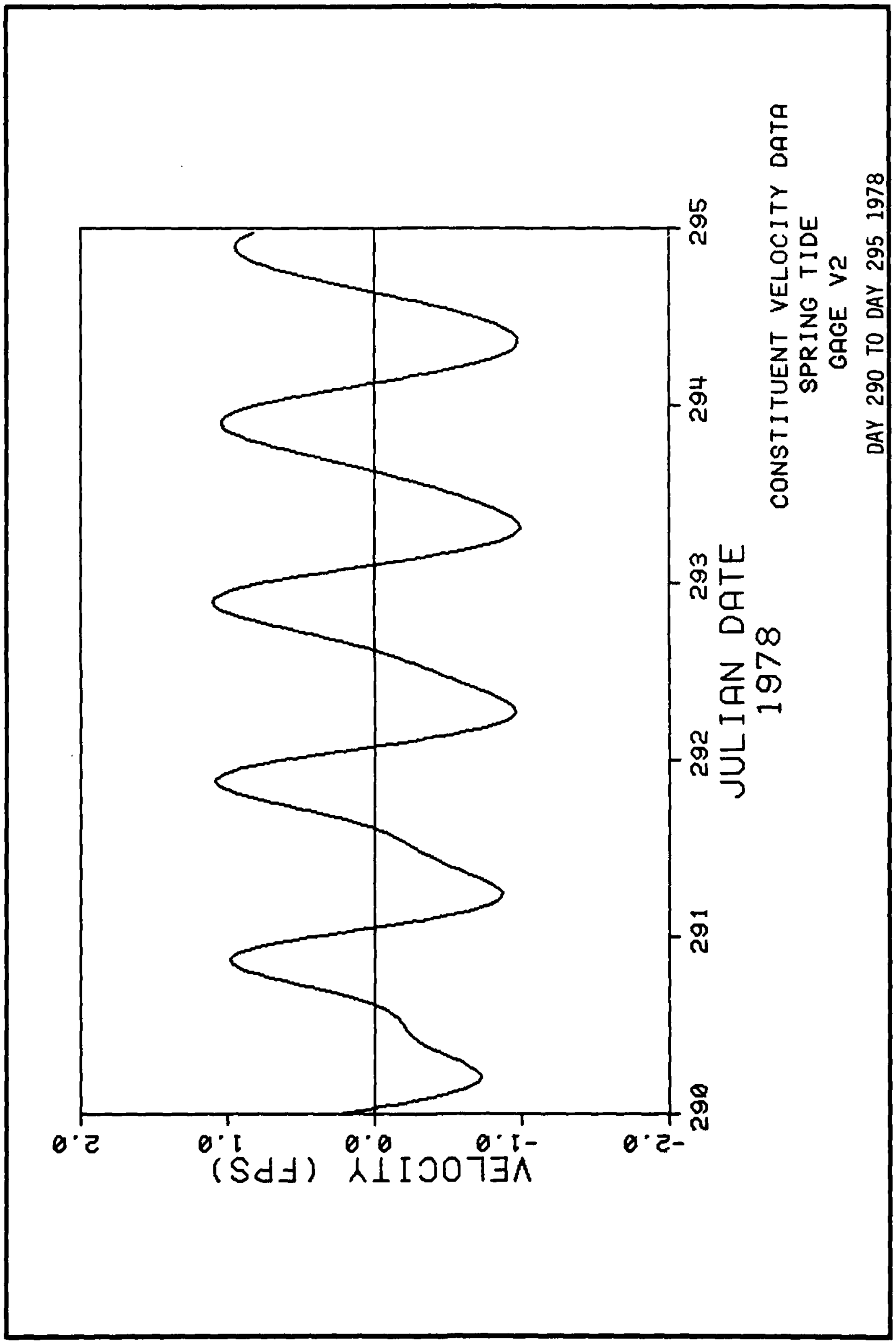

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V2
DAY 290 TO DAY 295 1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295
JULIAN DATE
1978

PLATE E115

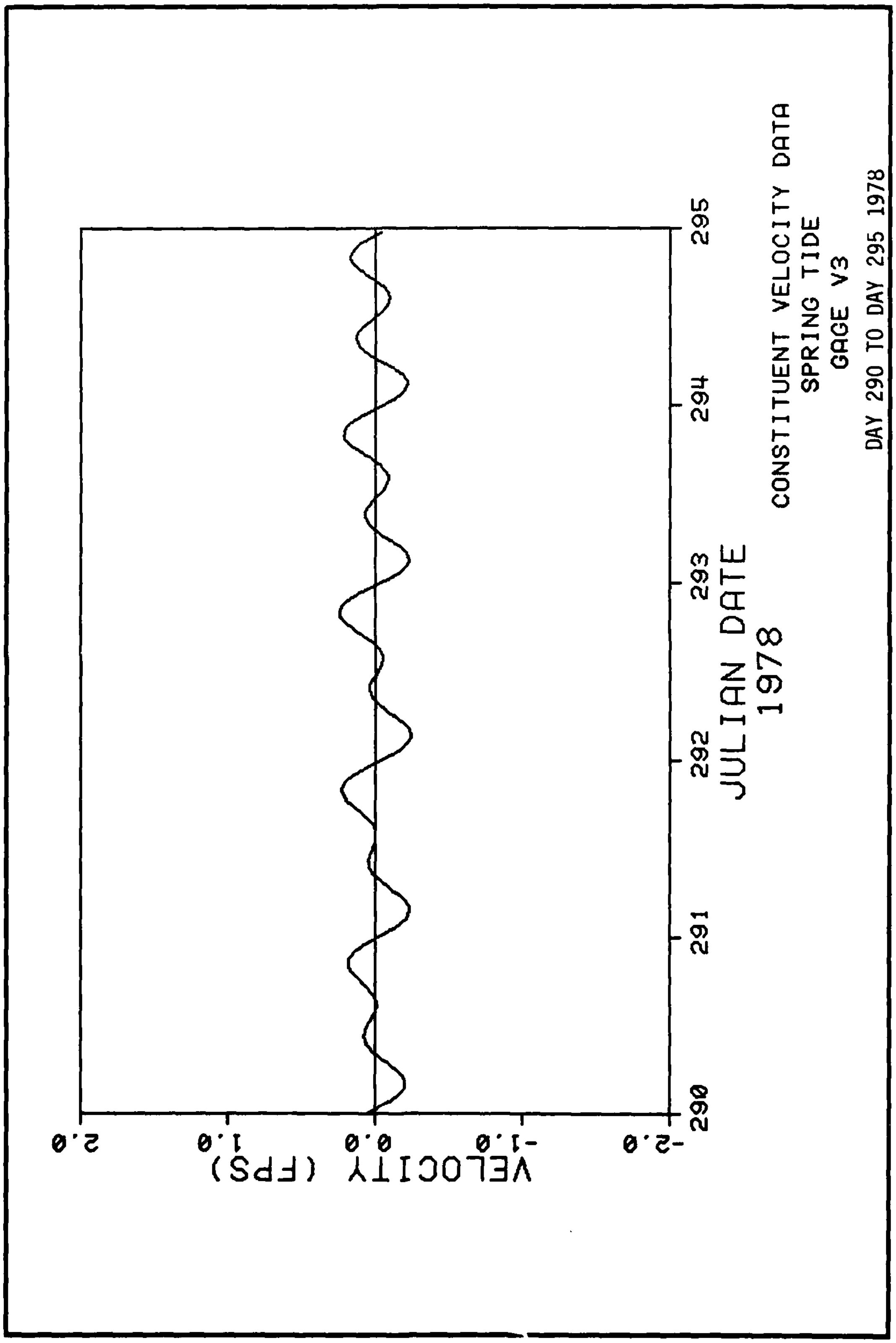

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V3
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
290
291
292
293
294
295
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0

PLATE E116

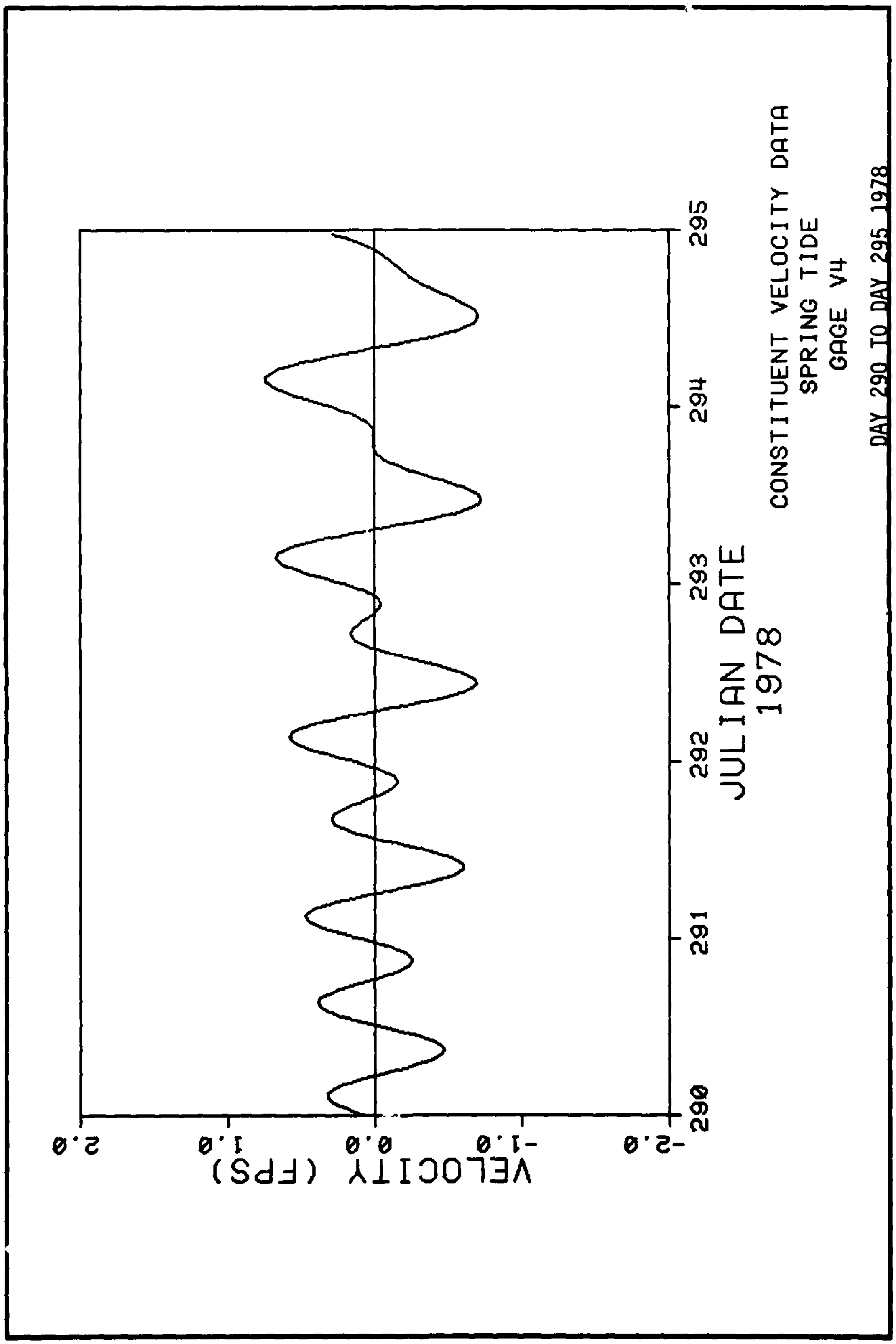

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V4
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E117

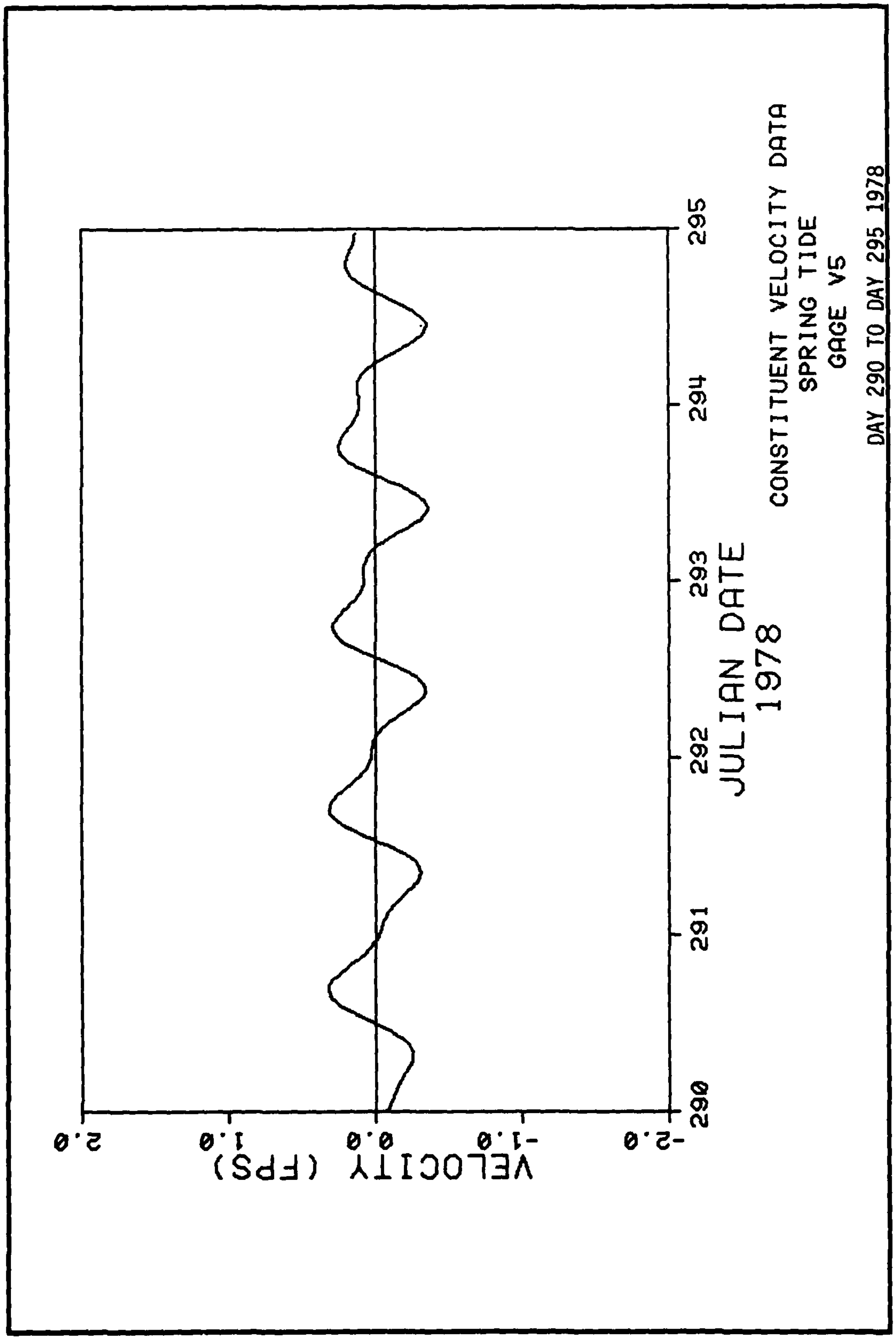

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V5
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E118

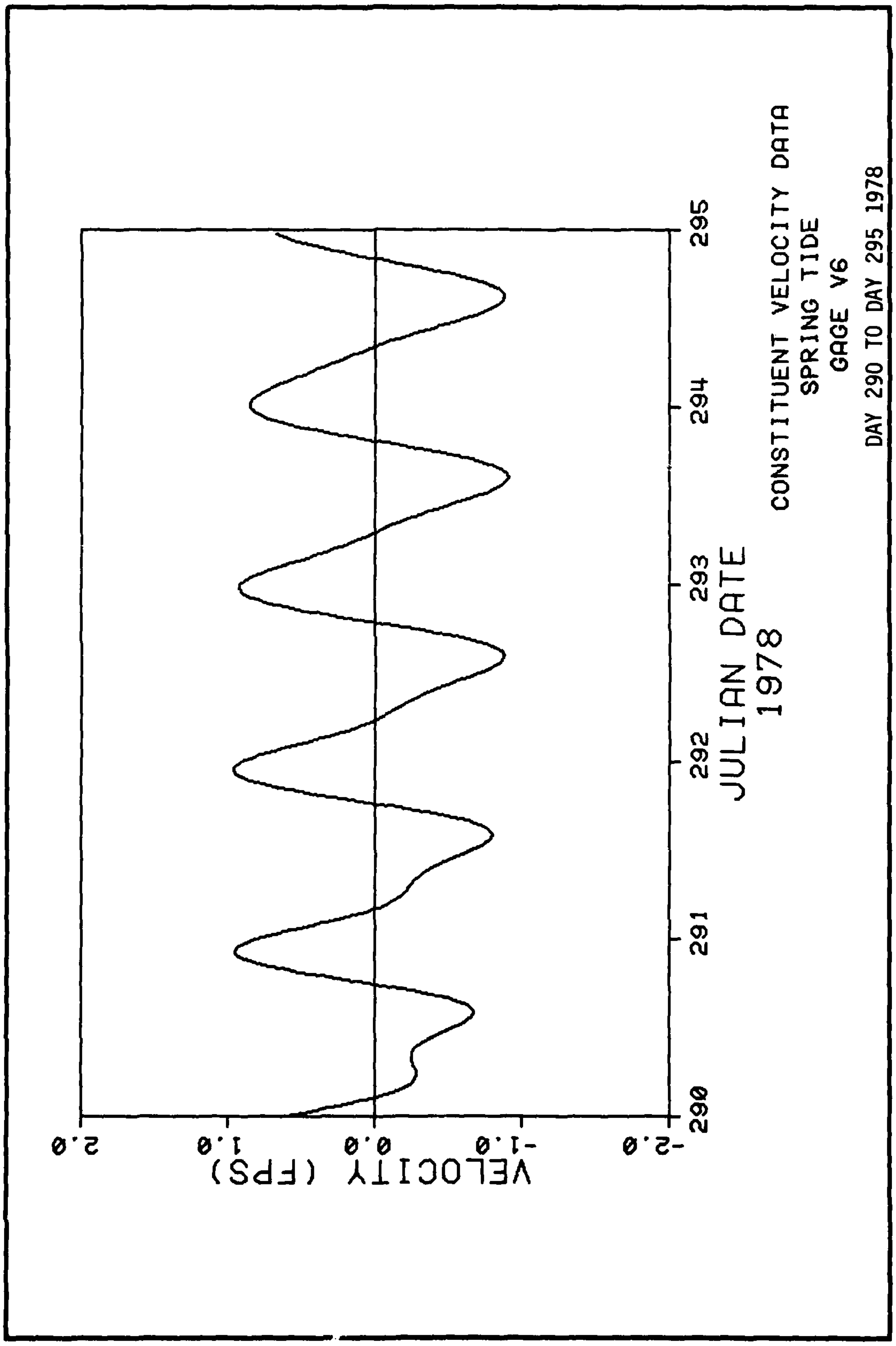

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V6
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E119

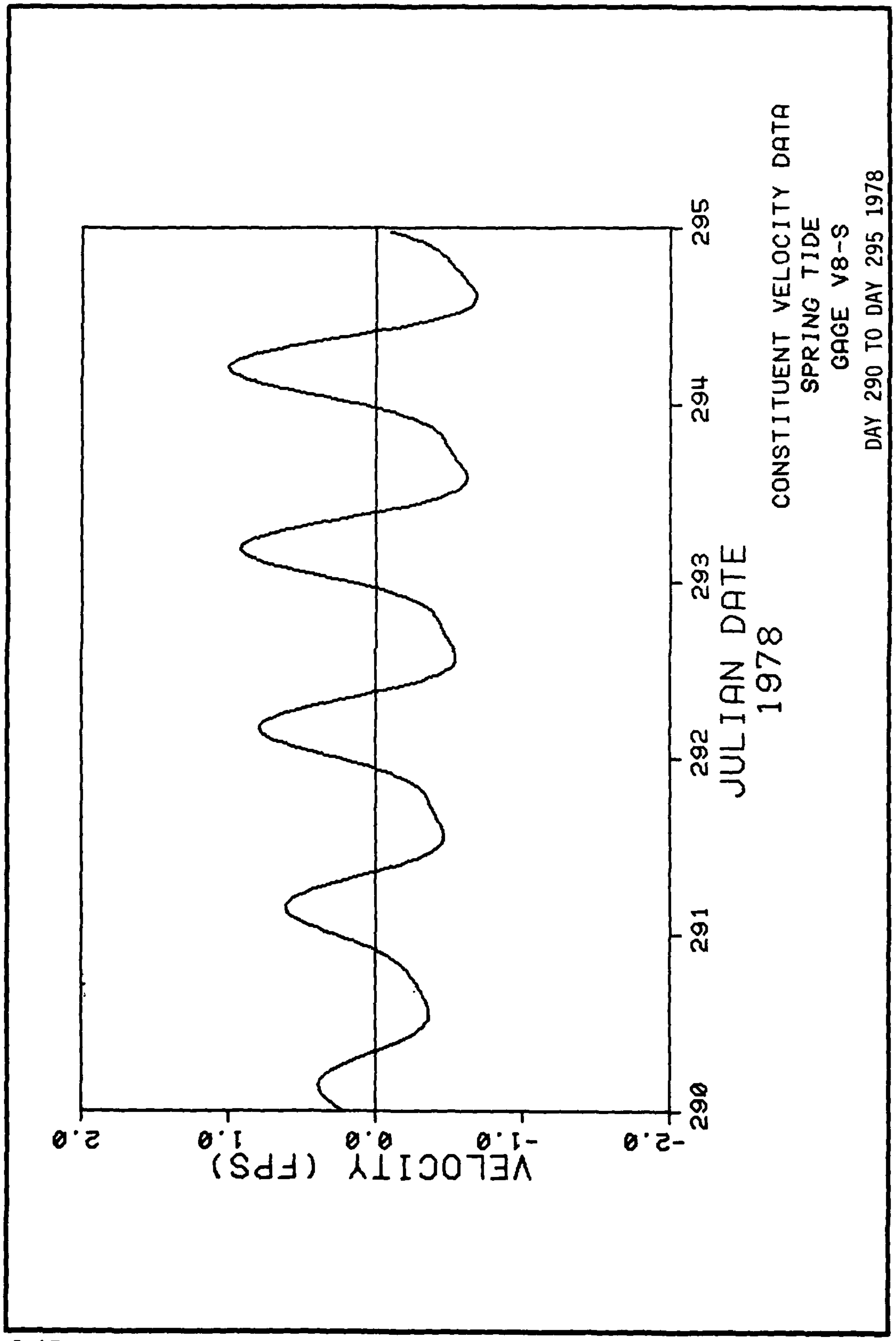
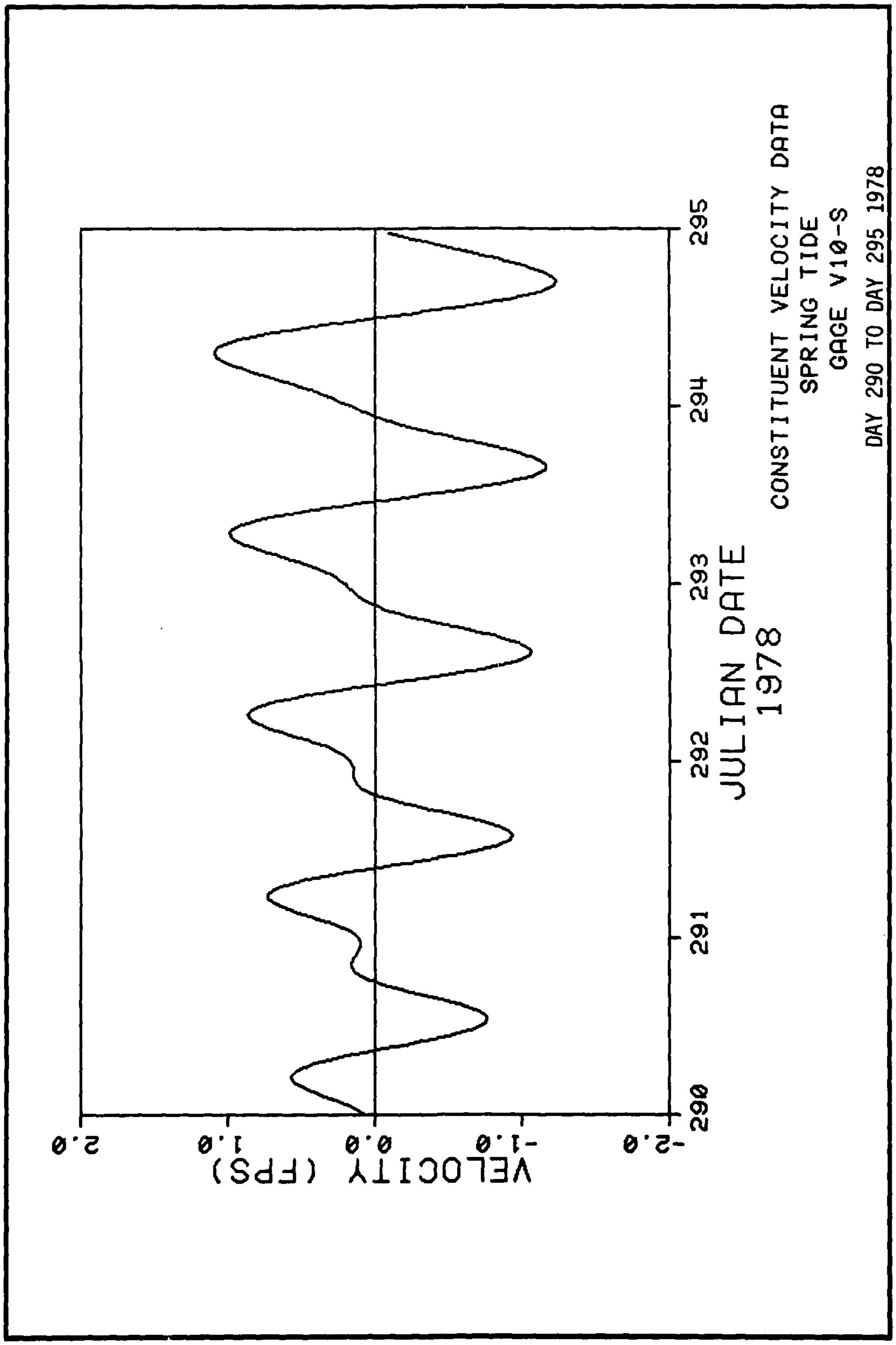

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V8-S
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
290
291
292
293
294
295
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0

PLATE E120



CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V10-S
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E121

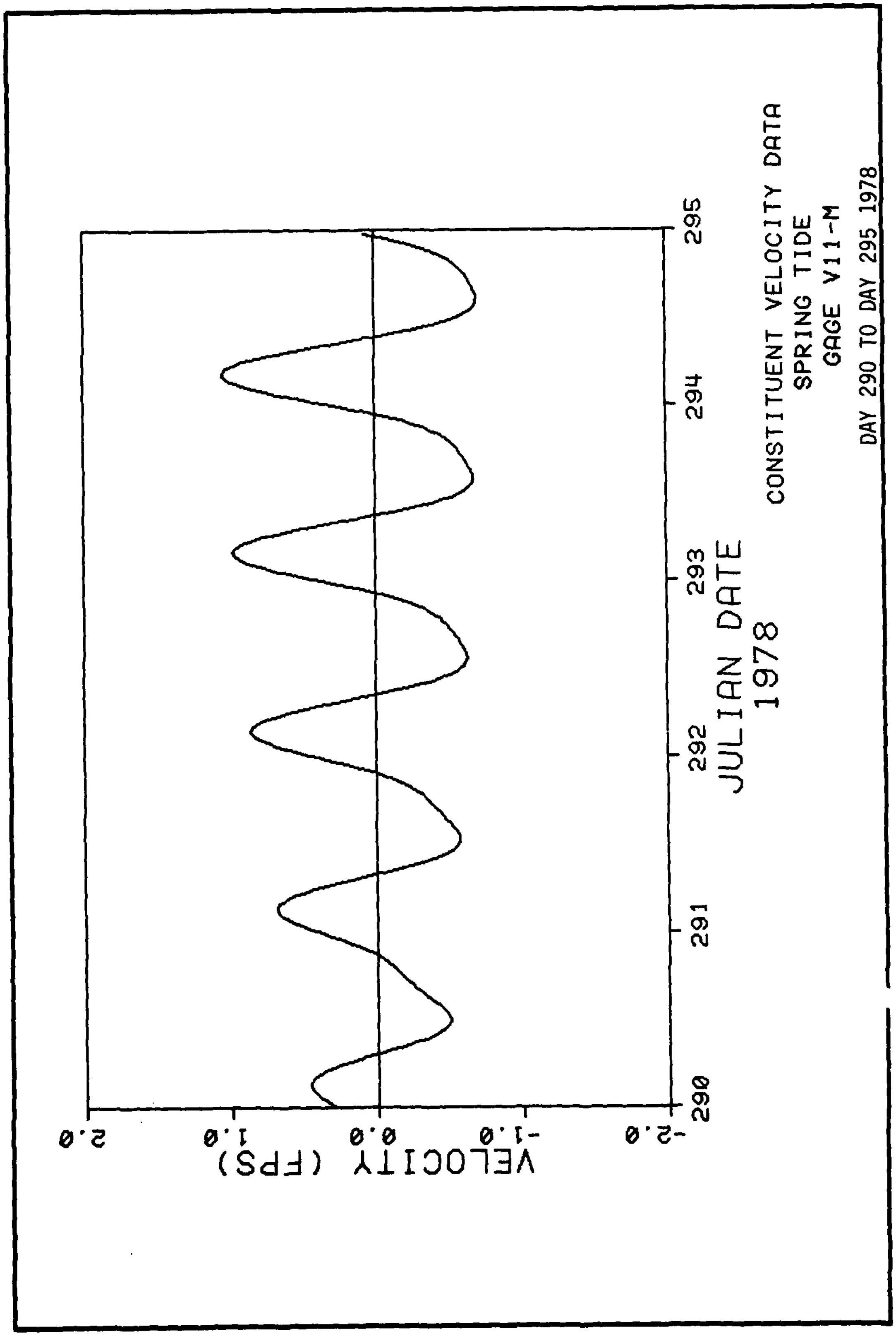
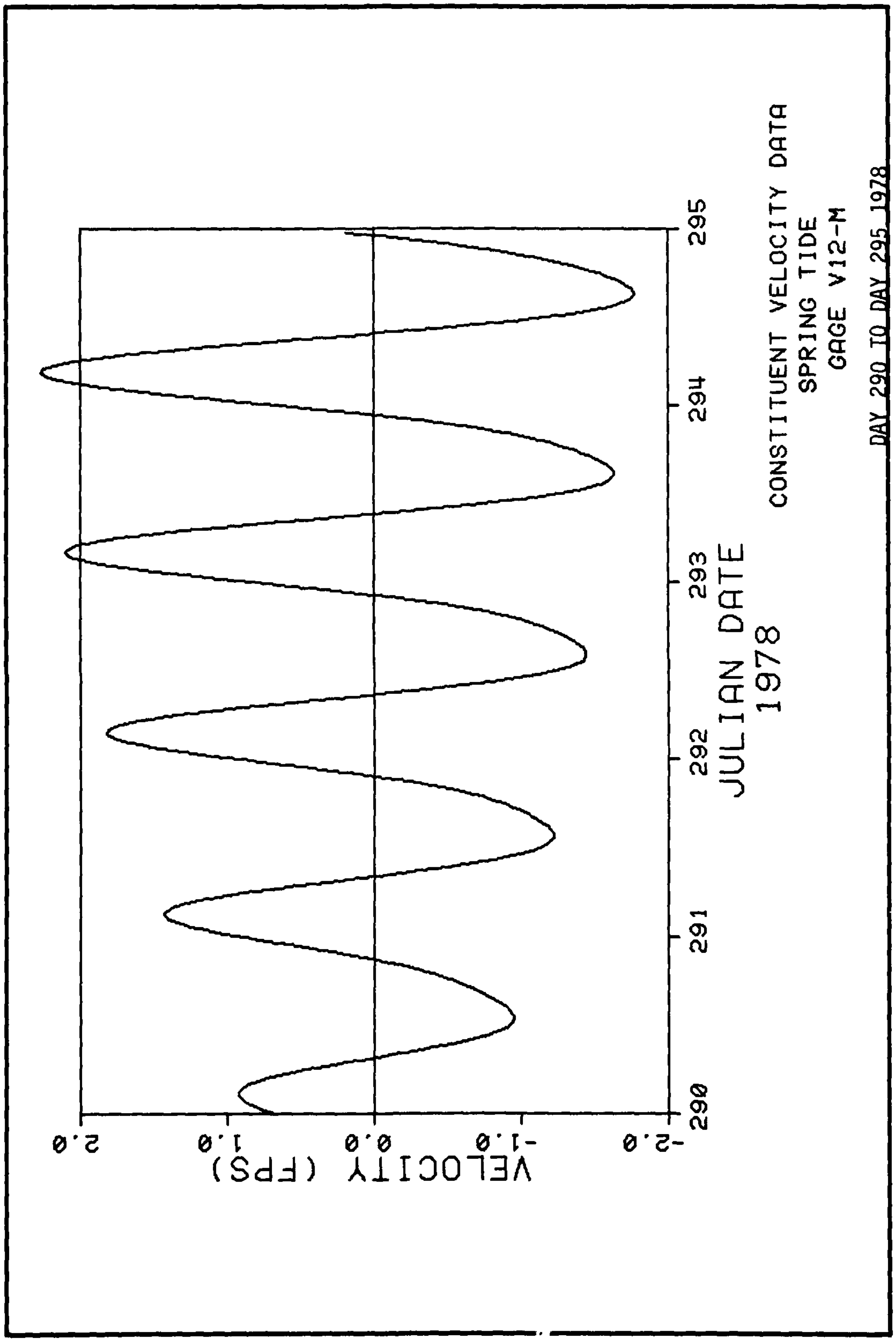

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V11-M
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
290
291
292
293
294
295
-2.0
-1.0
0.0
1.0
2.0

PLATE E122



CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V12-M
DAY 290 TO DAY 295 1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295
JULIAN DATE
1978

PLATE E123

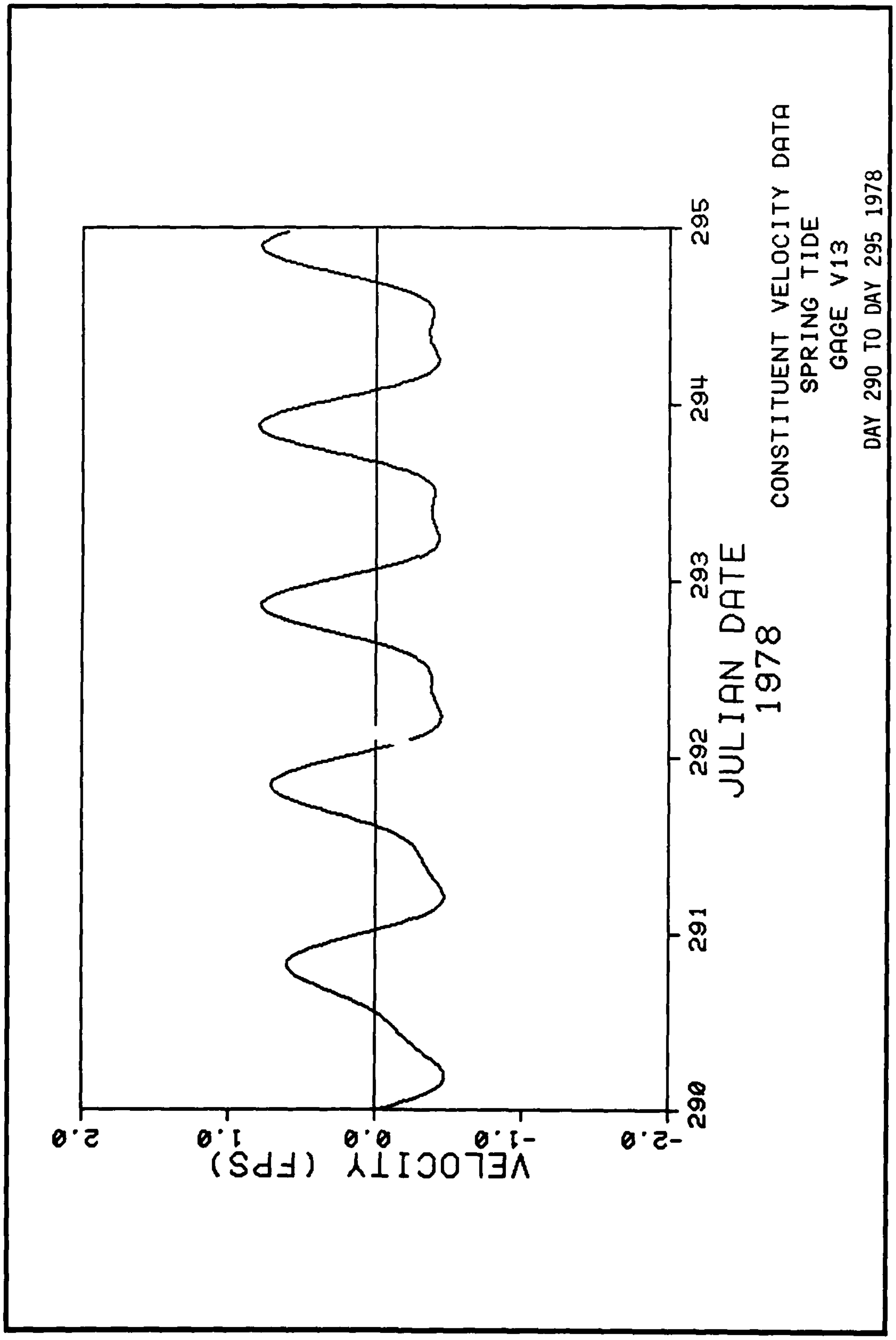

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V13
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E124

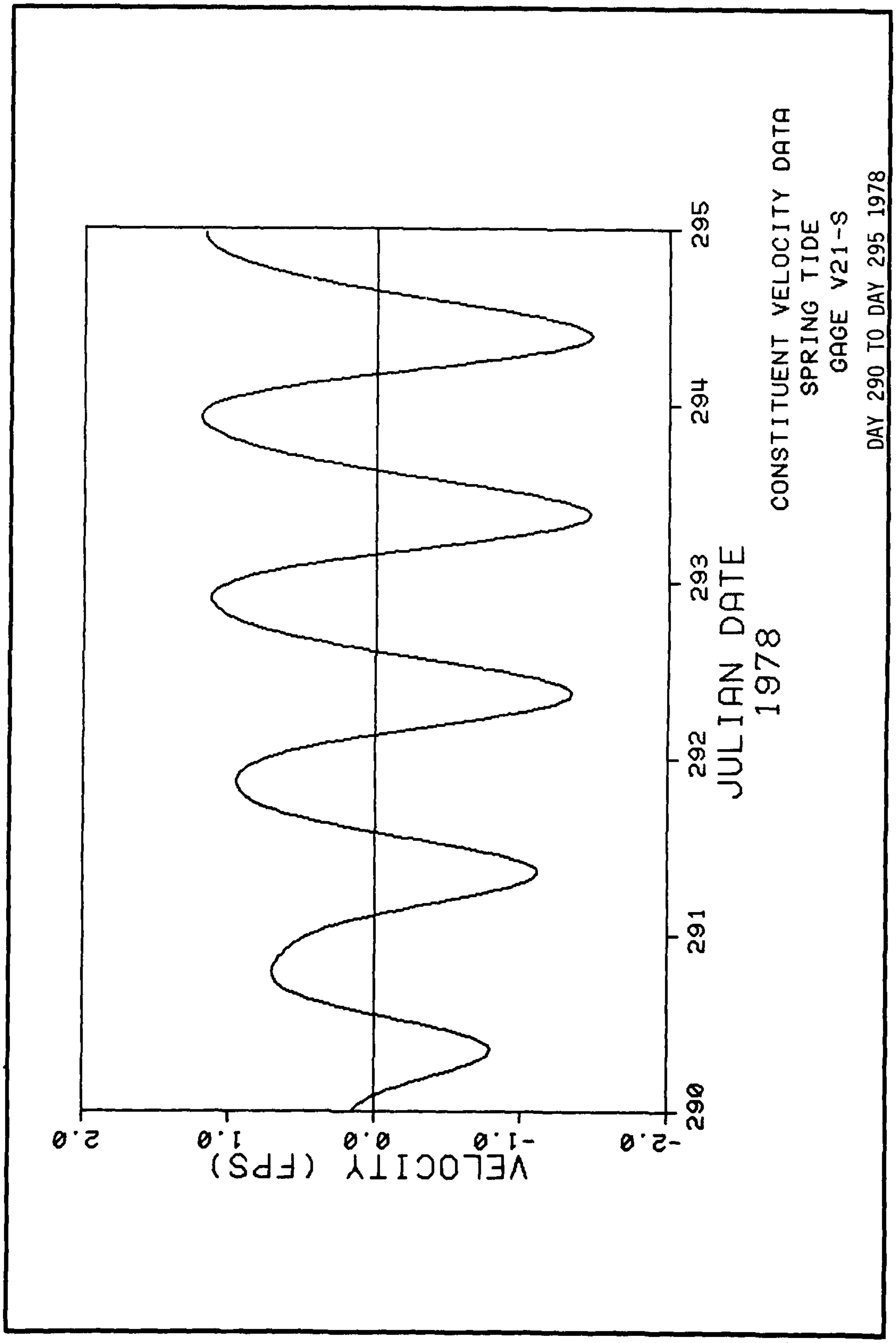
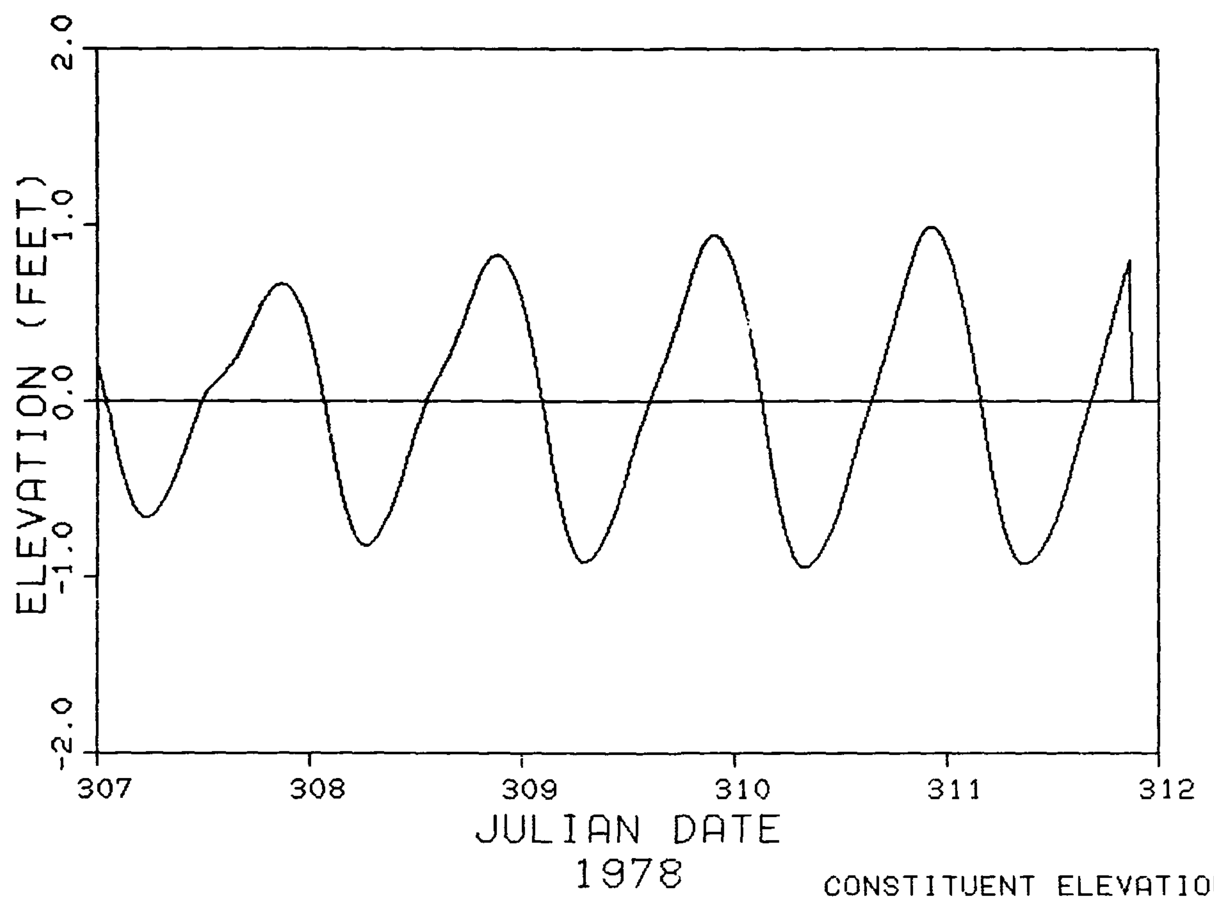

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V21-S
DAY 290 TO DAY 295 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
290
291
292
293
294
295

PLATE E125



CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-1

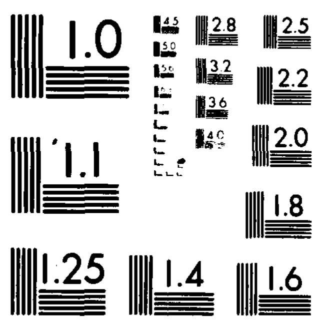
DAY 307 TO DAY 312 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

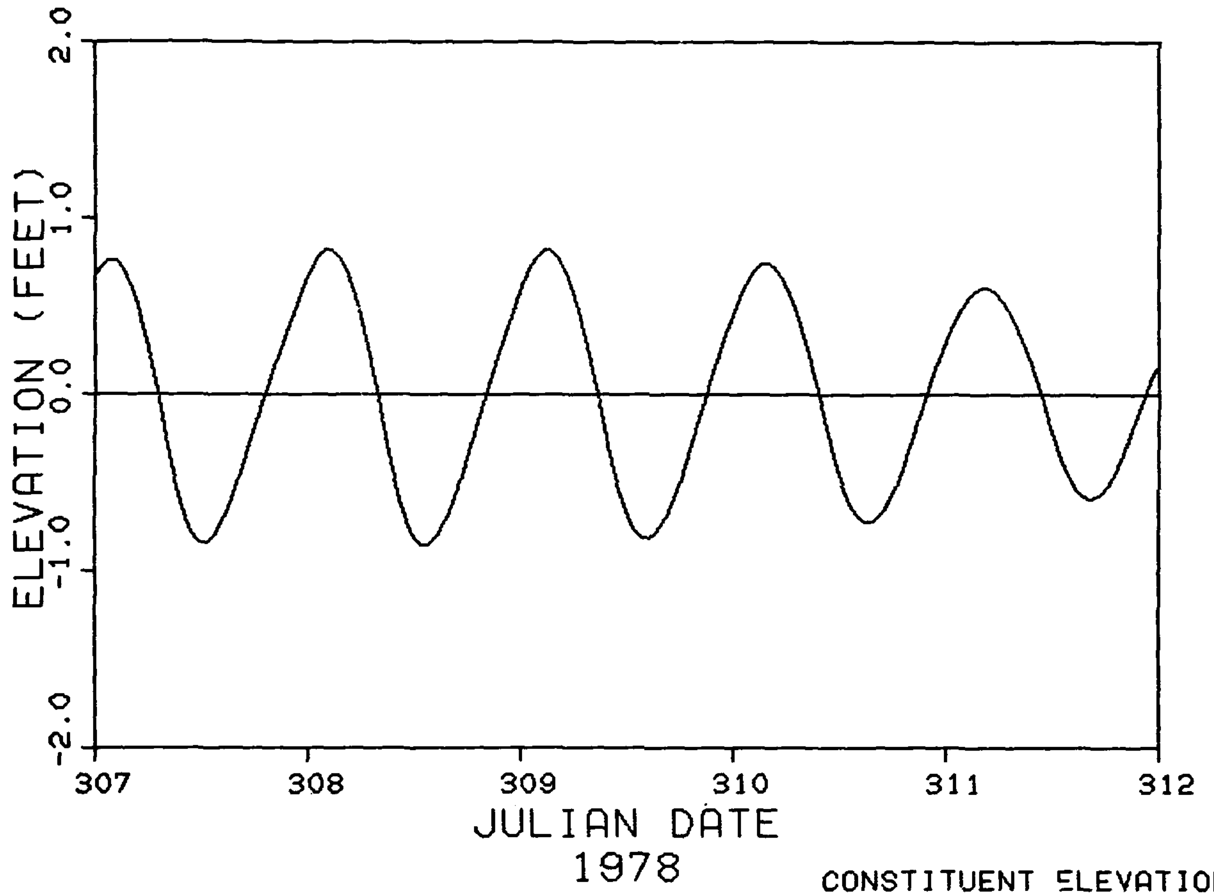
AD-A112 996 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG--ETC F/G 8/8
LAKE PONTCHARTRAIN AND VICINITY HURRICANE PROTECTION PLAN. REPO--ETC(U)
JAN 82 D G OUTLAW
UNCLASSIFIED WES/TR/HL-82-2-1 NL

7 of 7

END
DATE
FILMED
5-82
DTIC

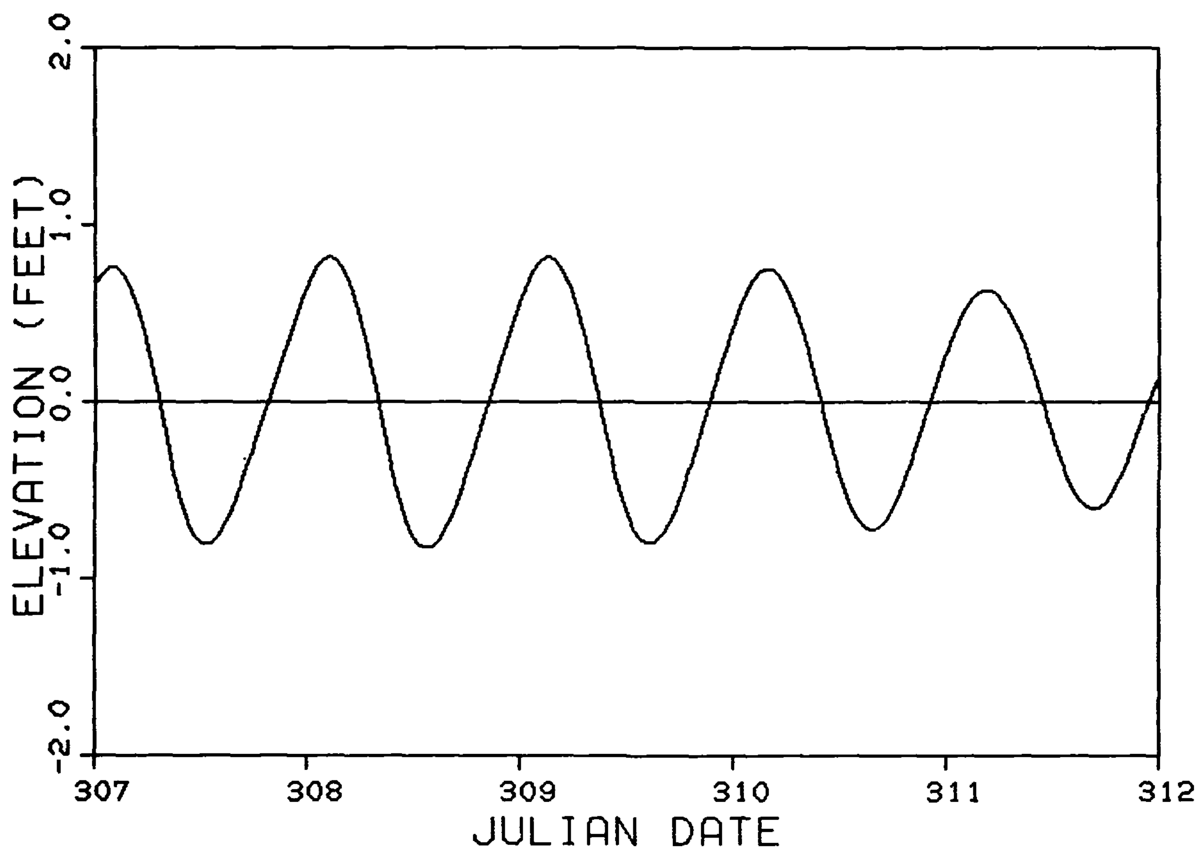


MICROCOPY RESOLUTION TEST CHART



CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-2
DAY 307 TO DAY 312 1978

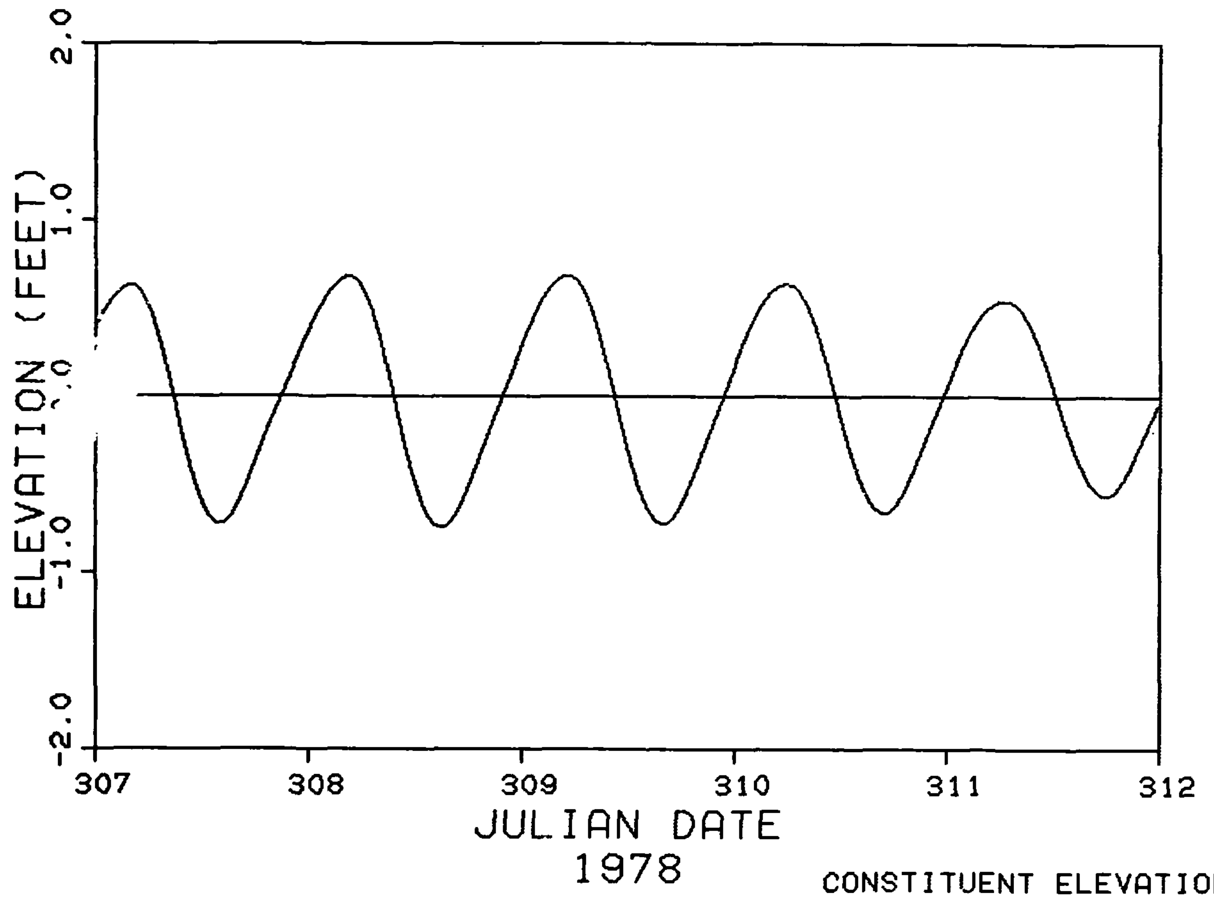
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-3

DAY 307 TO DAY 312 1978

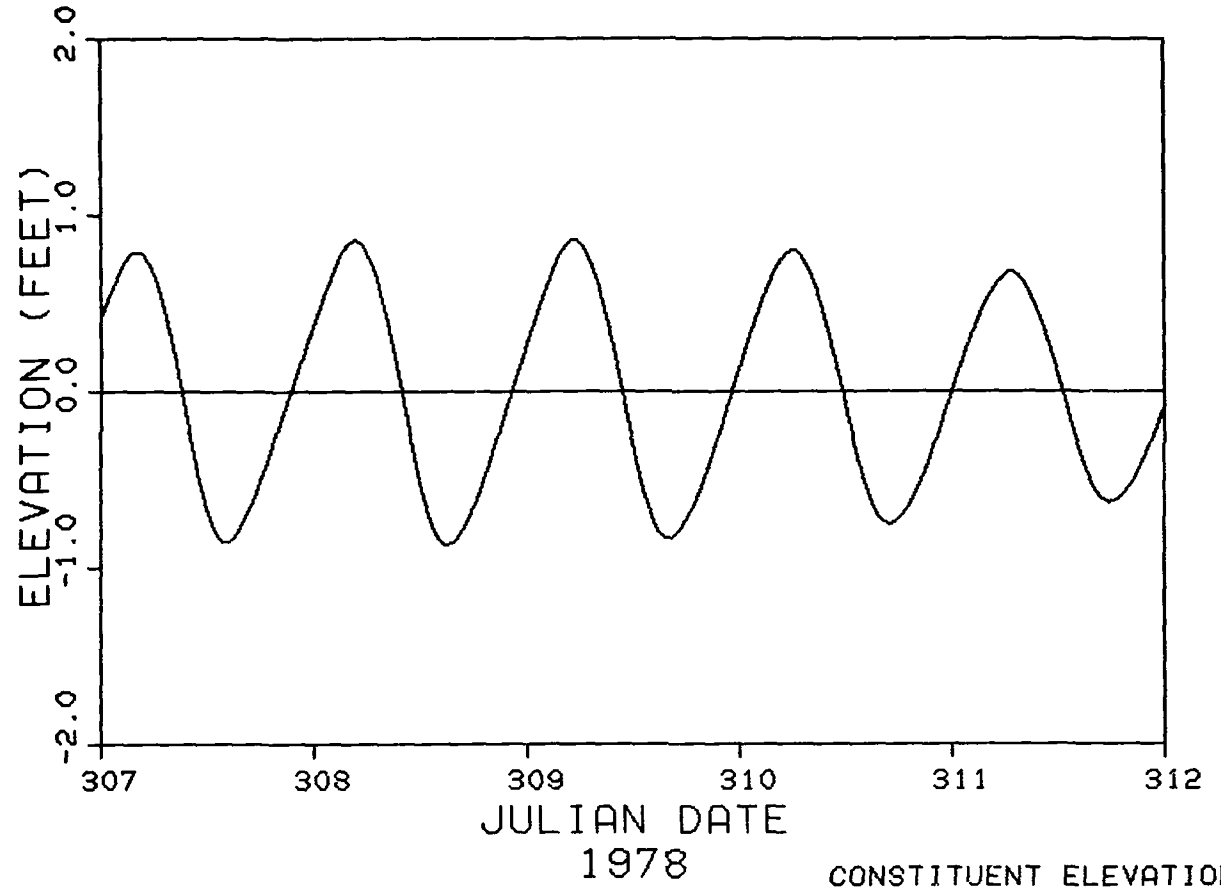


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-4

DAY 307 TO DAY 312 1978

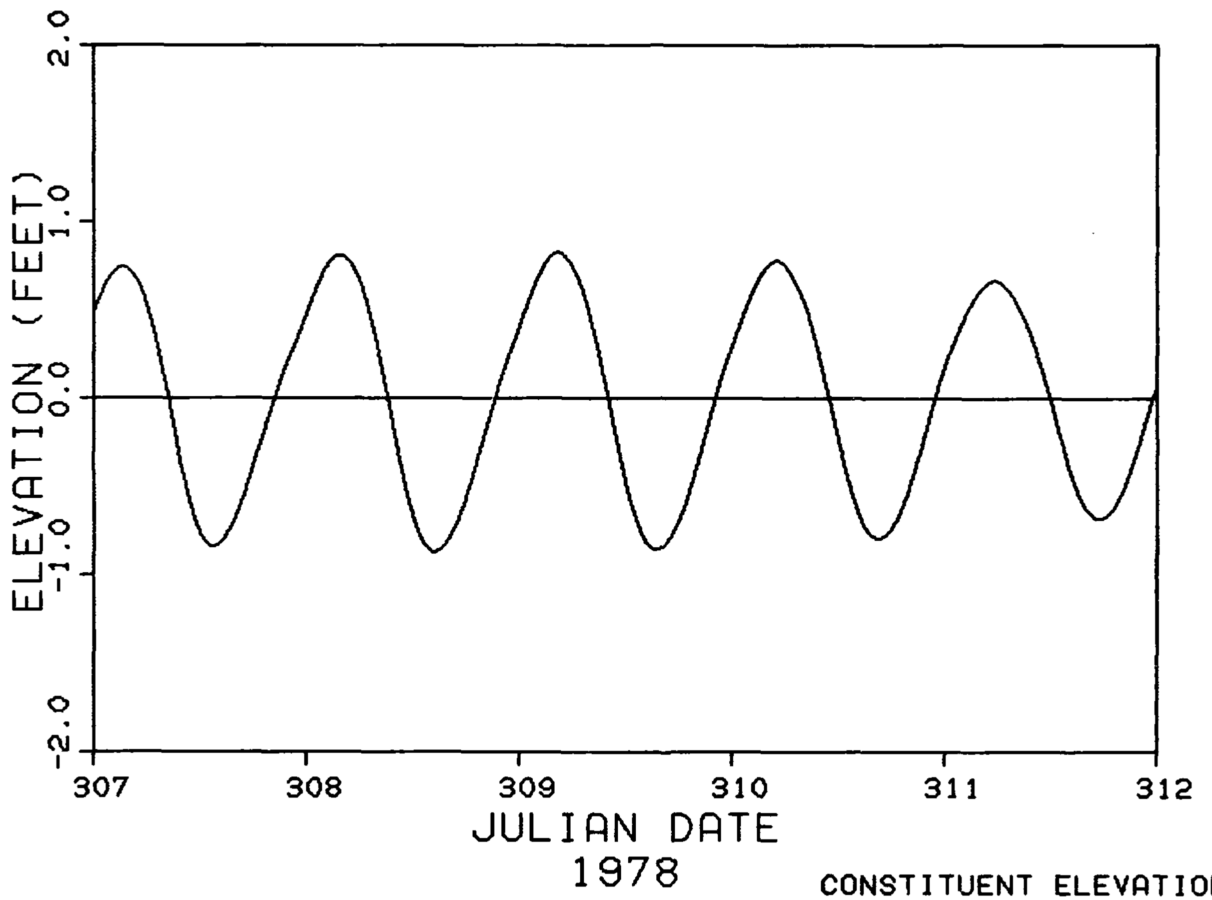
PLATE E129



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-5
DAY 307 TO DAY 312 1978

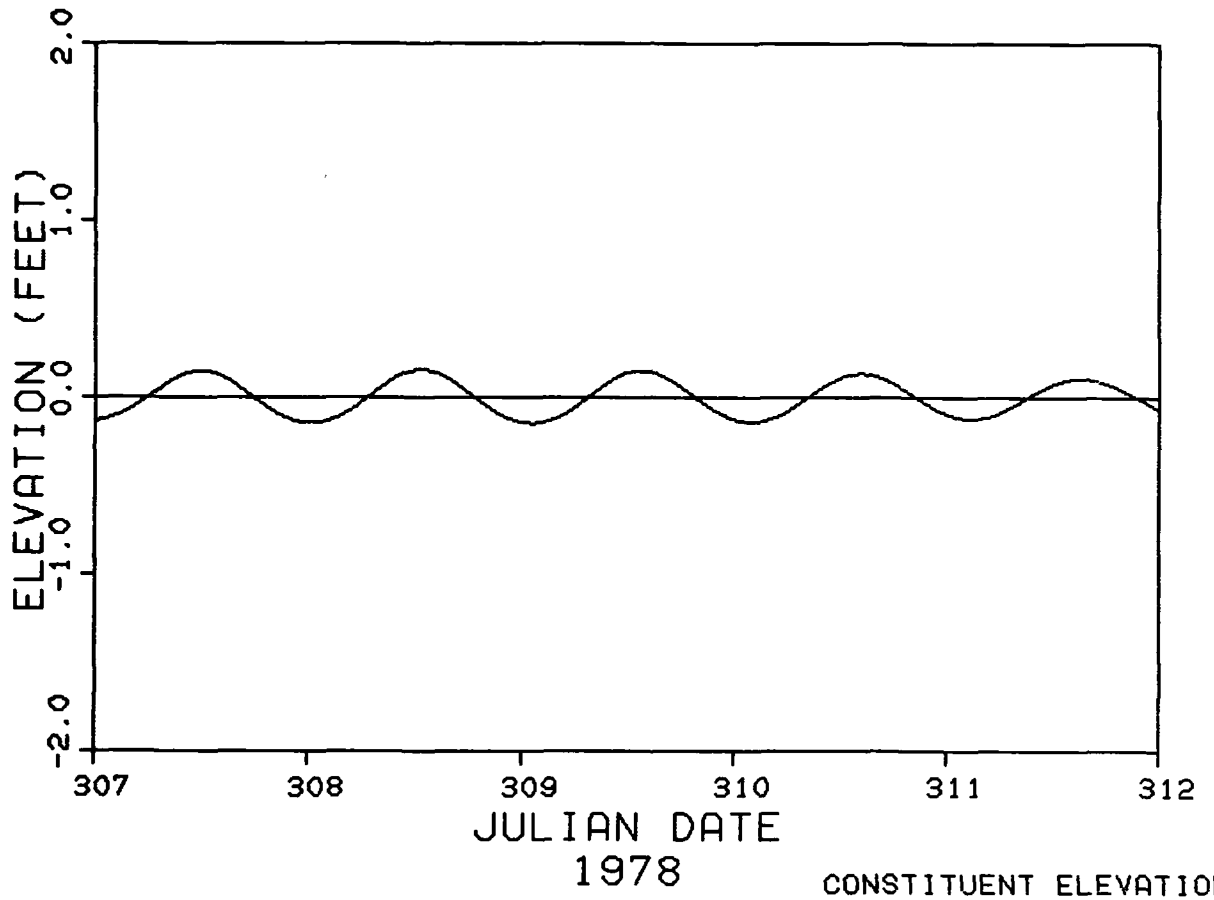
PLATE E130



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE B-6

DAY 307 TO DAY 312 1978

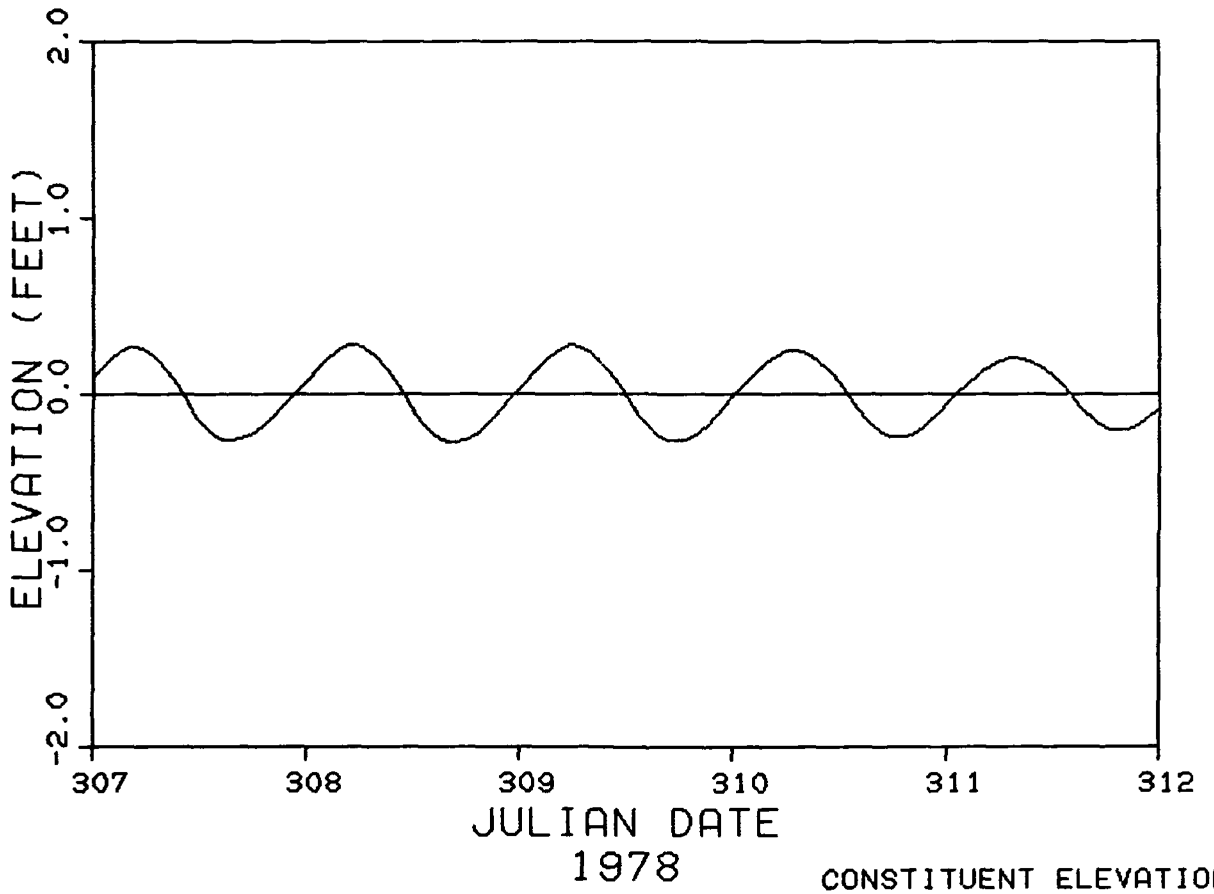


CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE M-1

DAY 307 TO DAY 312 1978

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

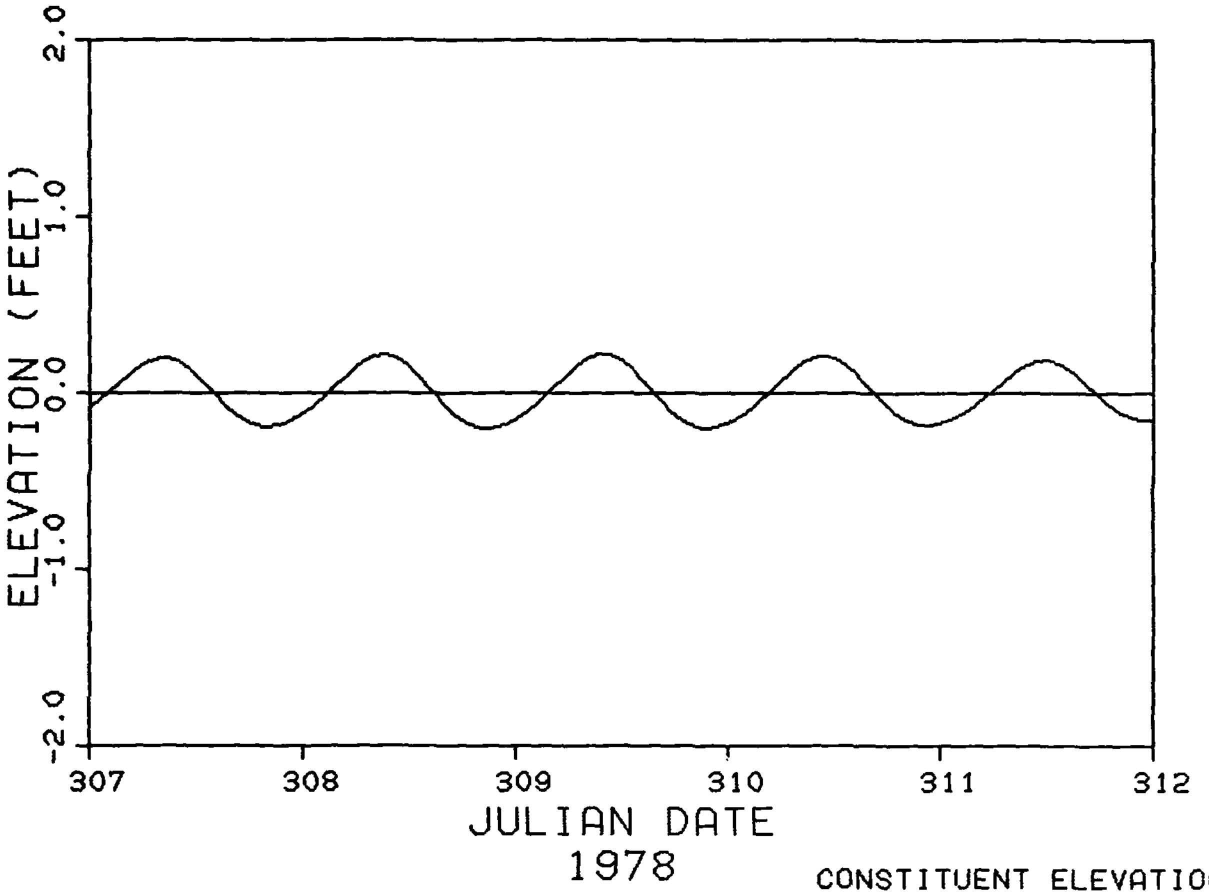
PLATE E132



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

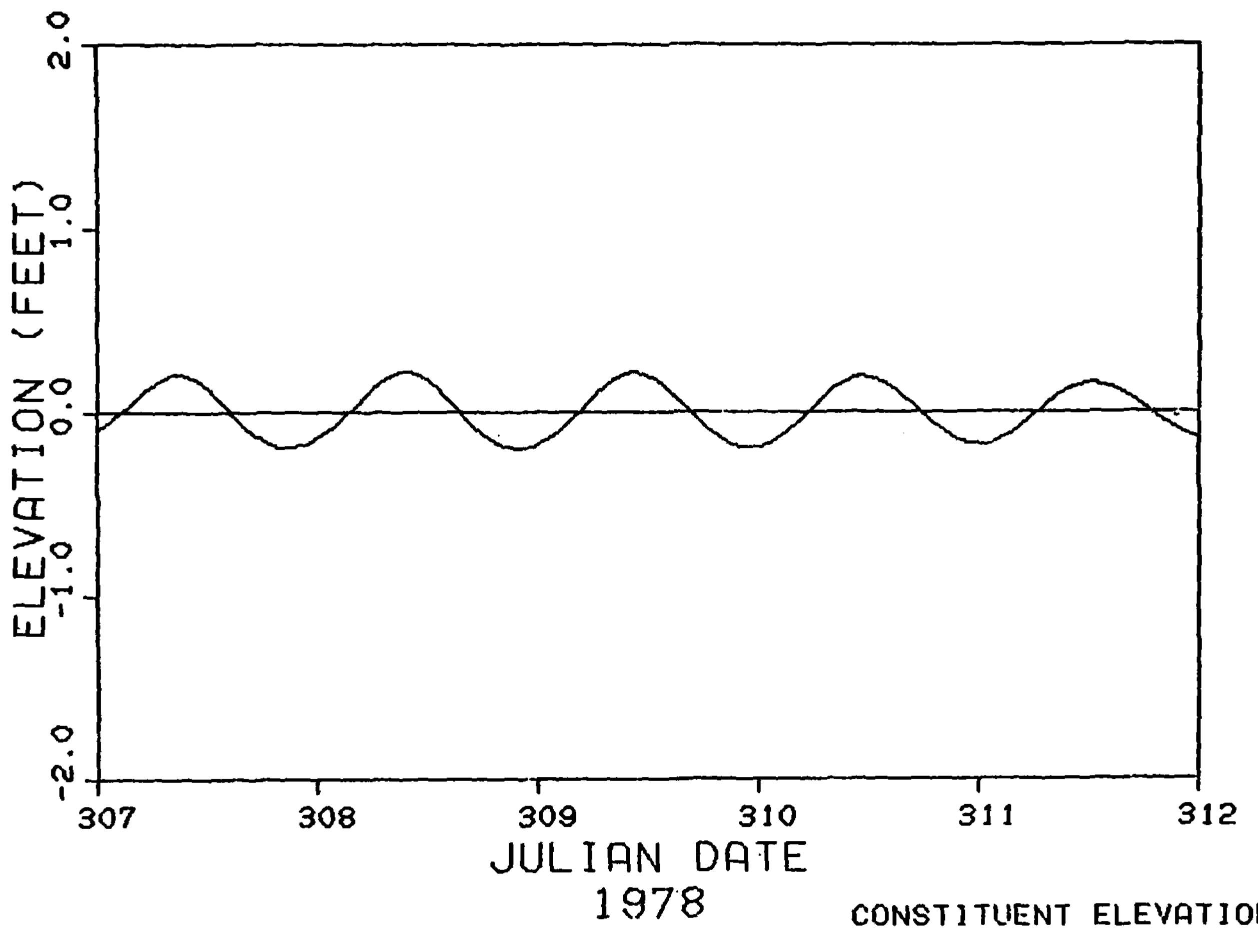
CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-1

DAY 307 TO DAY 312 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

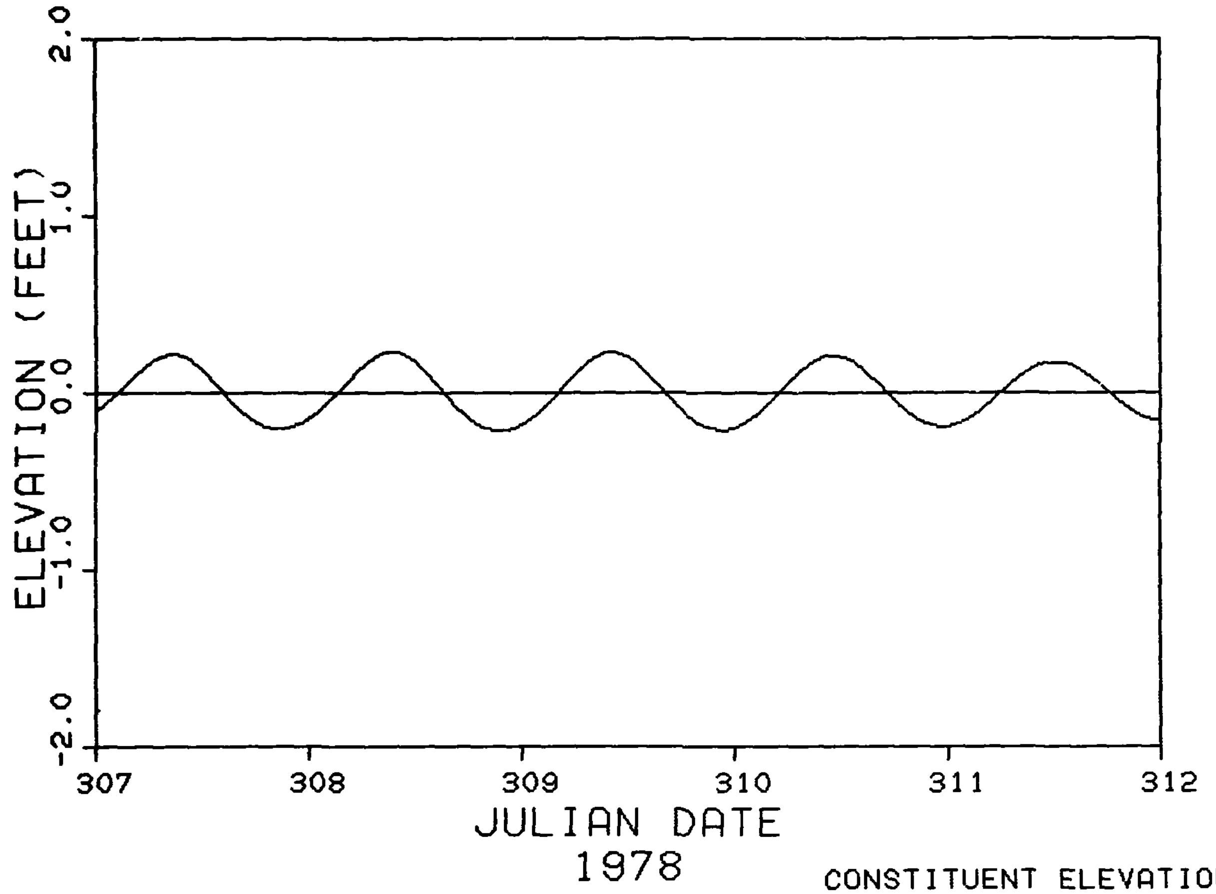
CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-2
DAY 307 TO DAY 312 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-3

DAY 307 TO DAY 312 1978

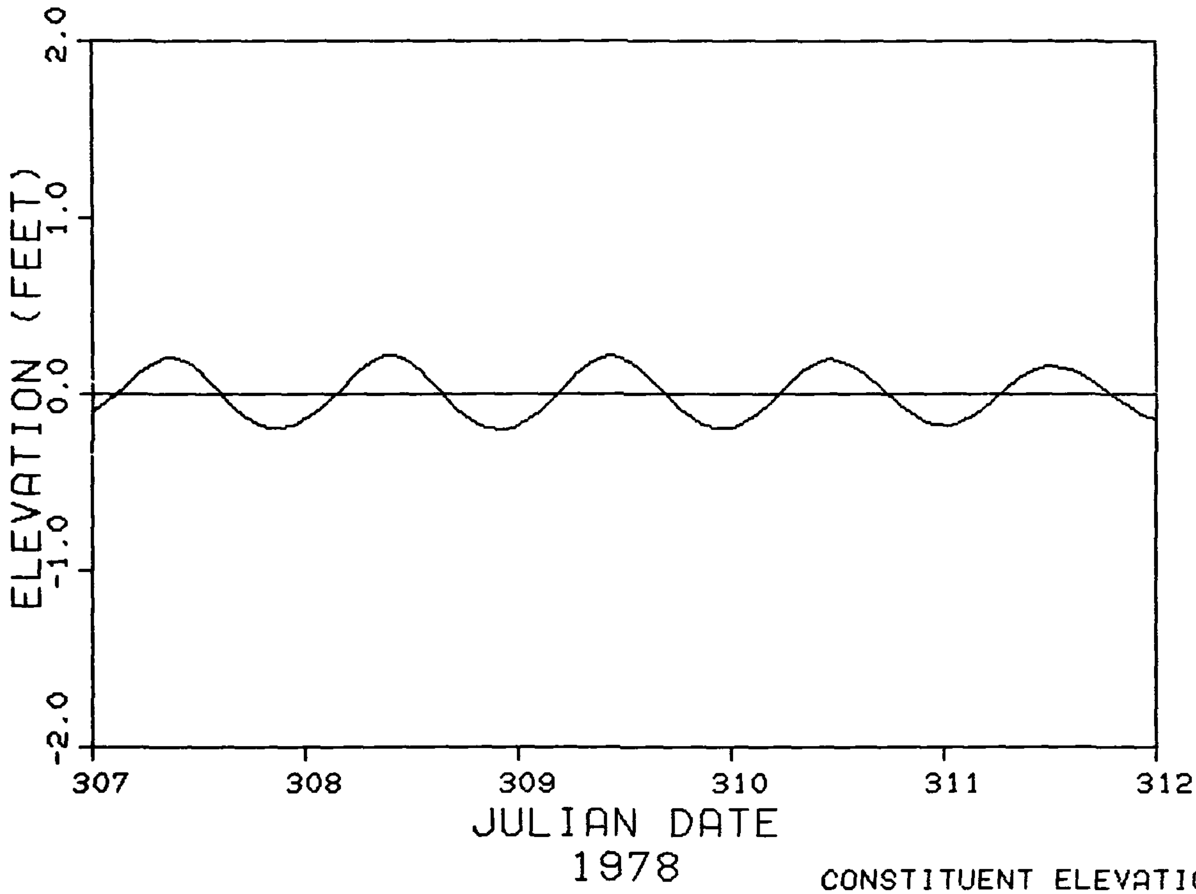


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-4

DAY 307 TO DAY 312 1978

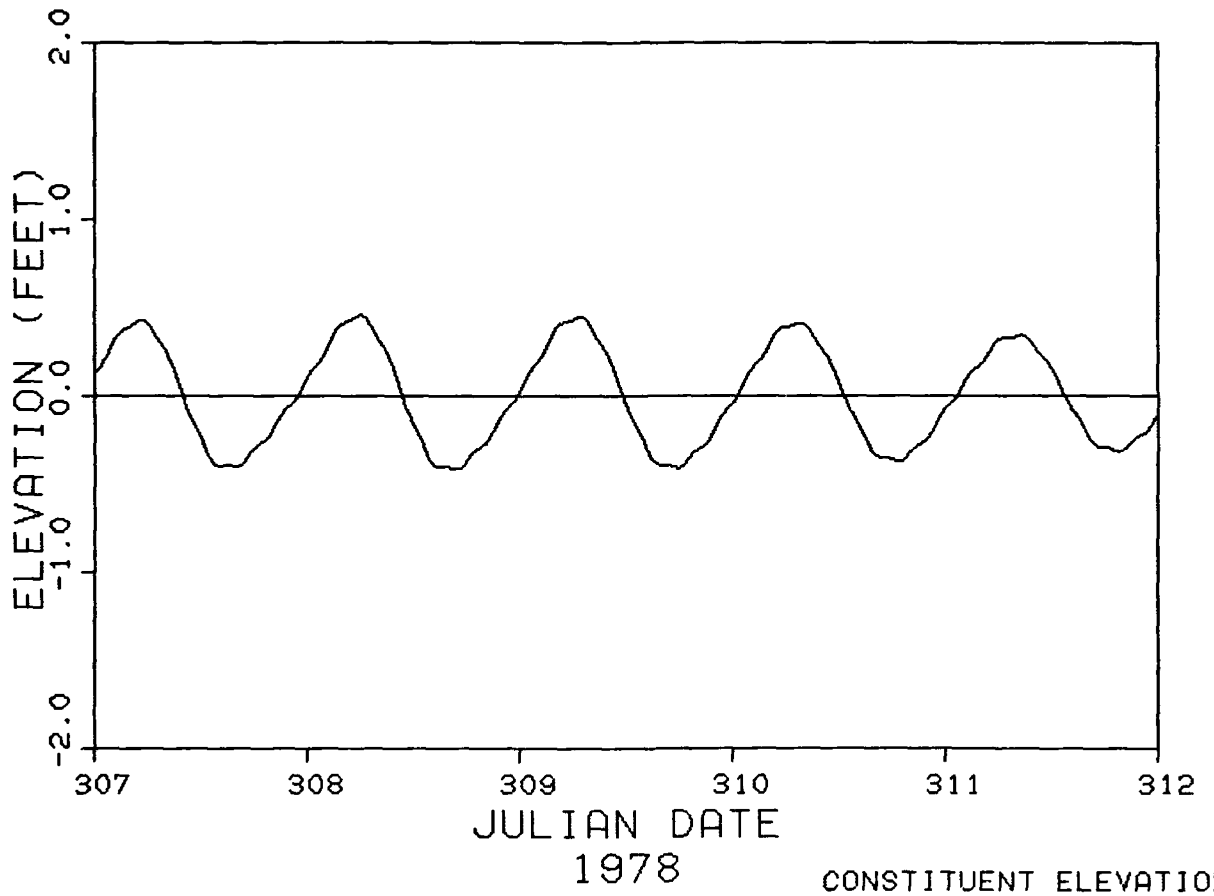
PLATE E136



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

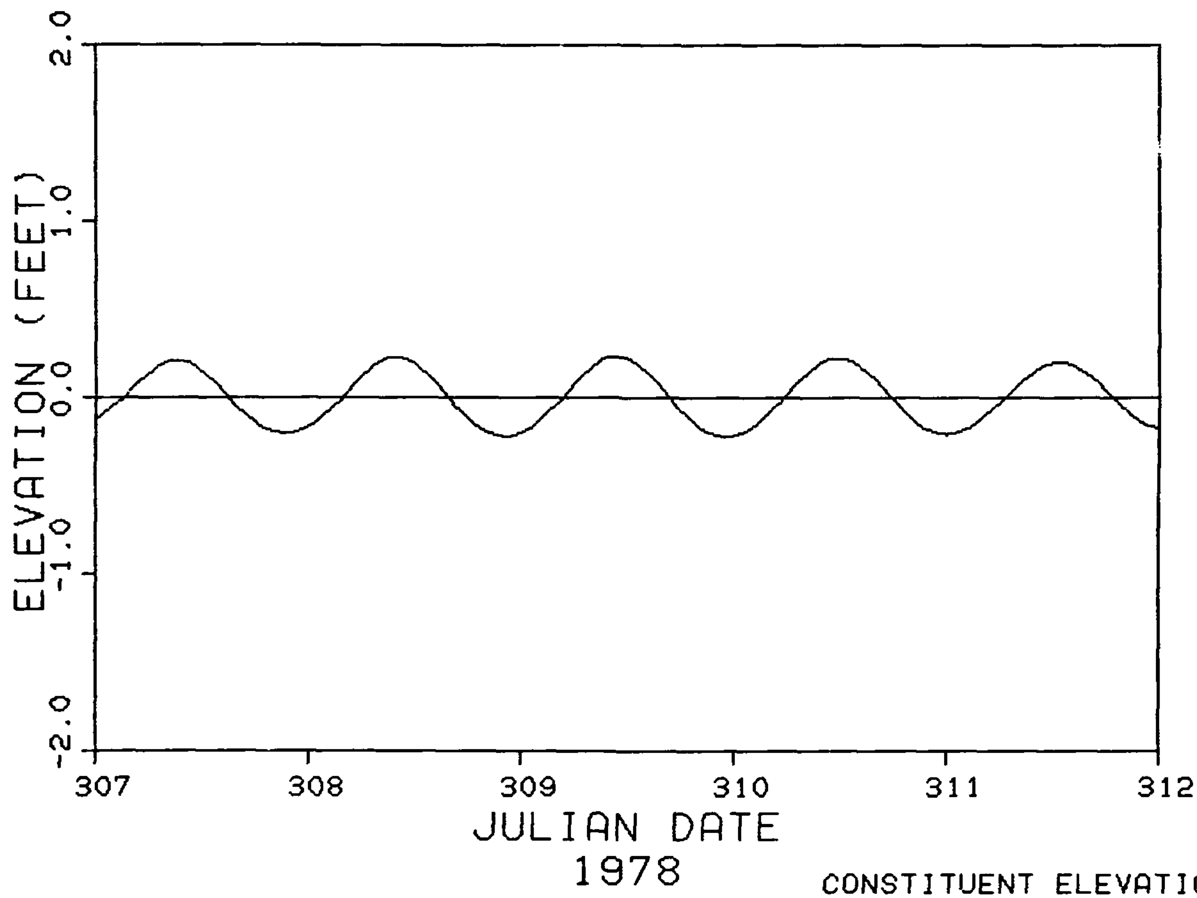
CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-5

DAY 307 TO DAY 312 1978



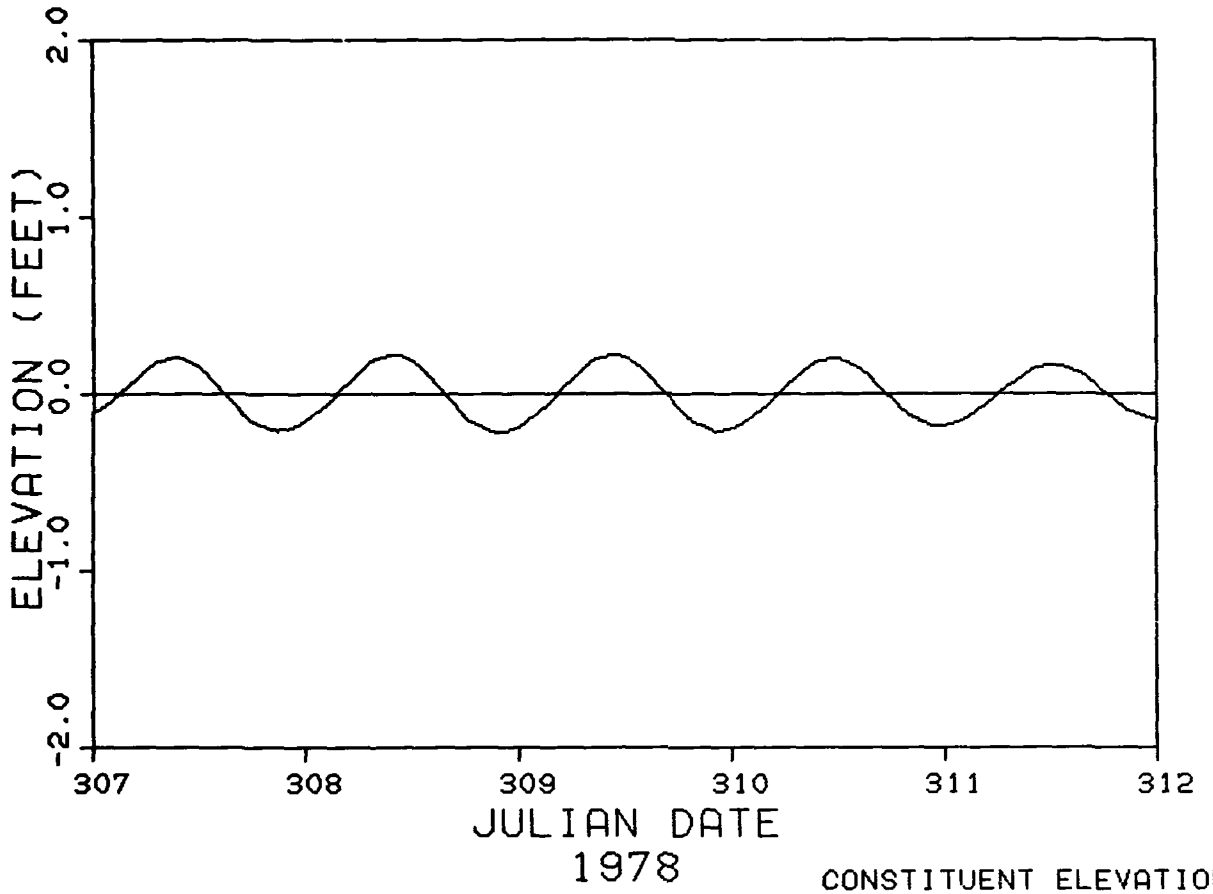
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-6
DAY 307 TO DAY 312 1978



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-7
DAY 307 TO DAY 312 1978

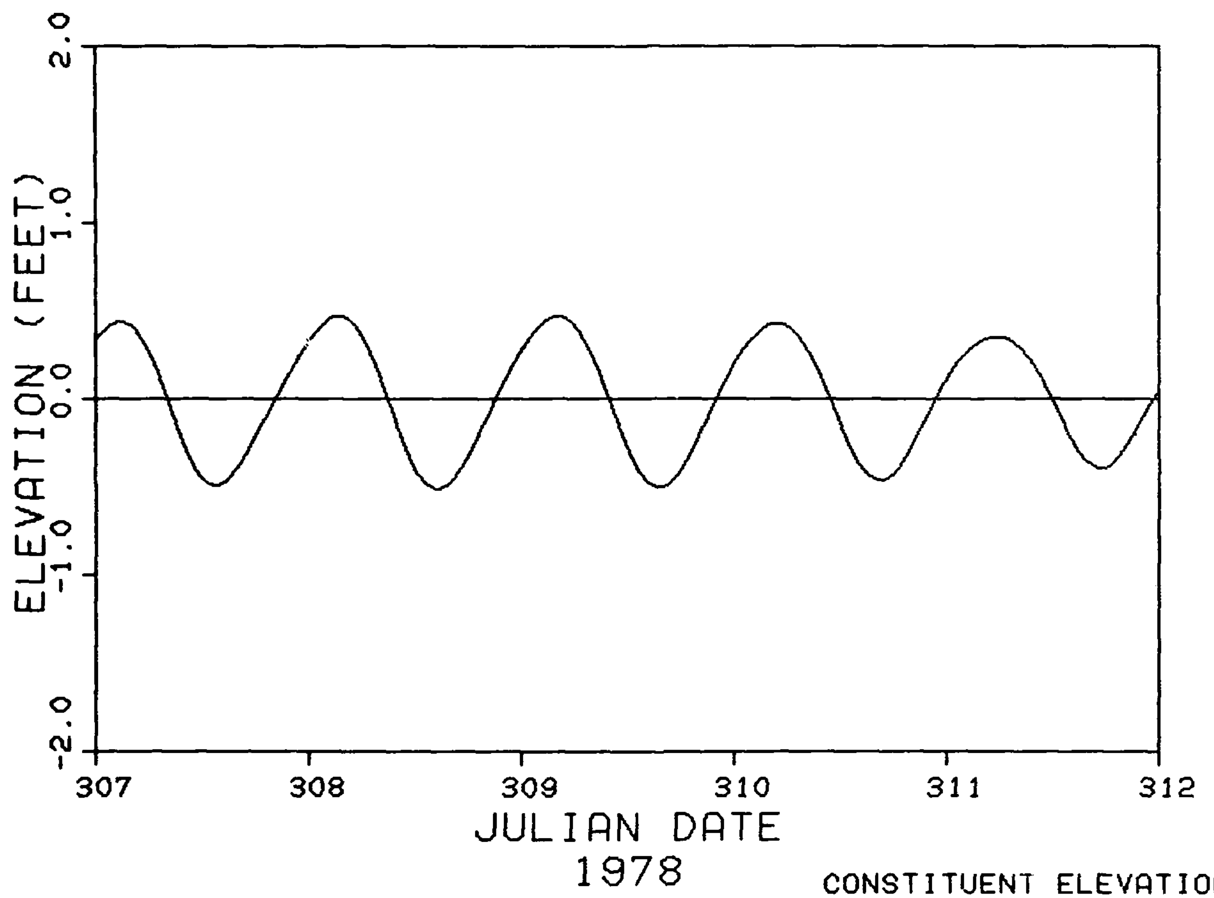


NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE P-9

DAY 307 TO DAY 312 1978

PLATE E140



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
SPRING TIDE
GAGE R-1

DAY 307 TO DAY 312 1978

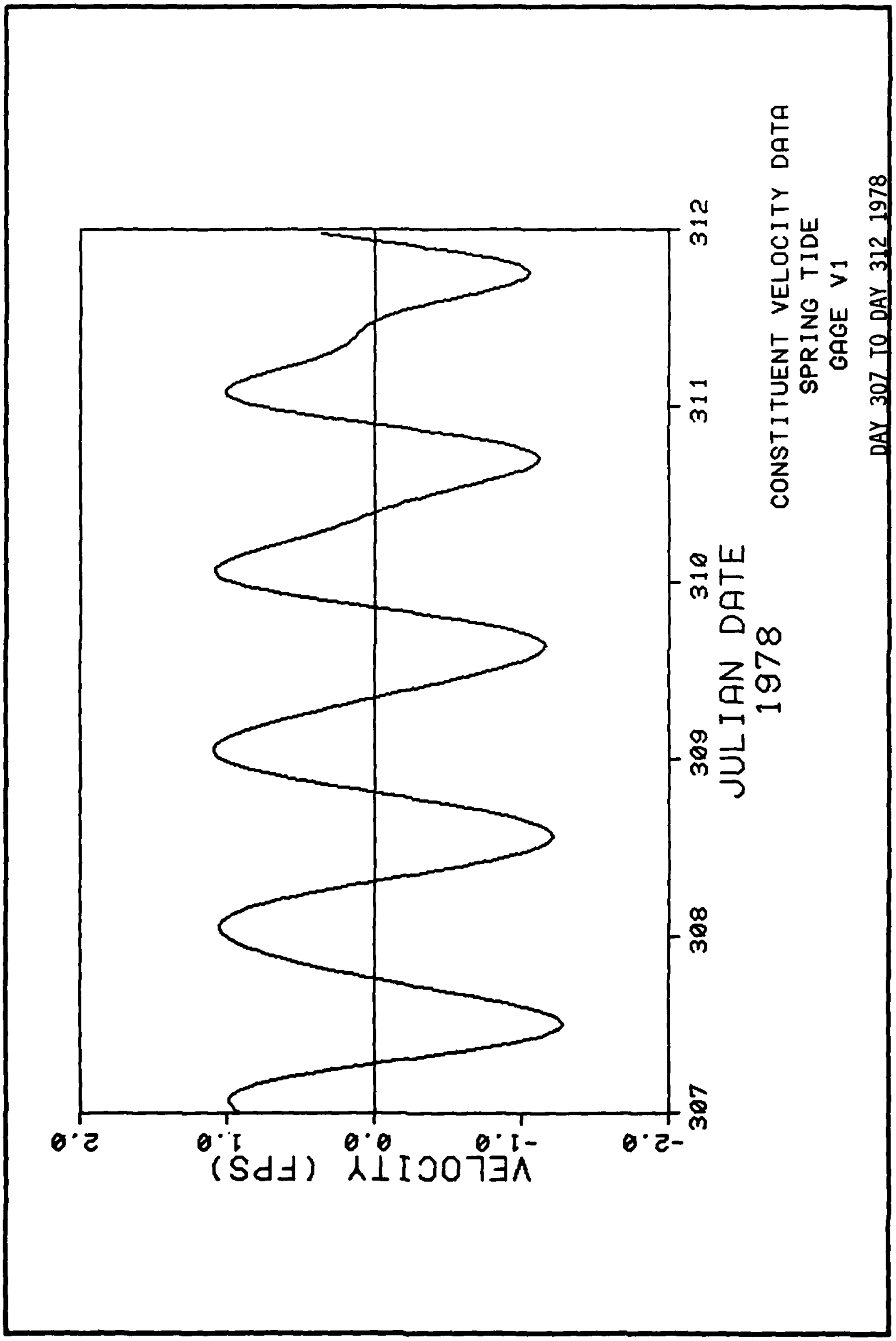

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V1
DAY 307 TO DAY 312 1978
JULIAN DATE
1978
VELOCITY (FPS)
307
308
309
310
311
312
2.0
1.0
0.0
-1.0
-2.0

PLATE E142

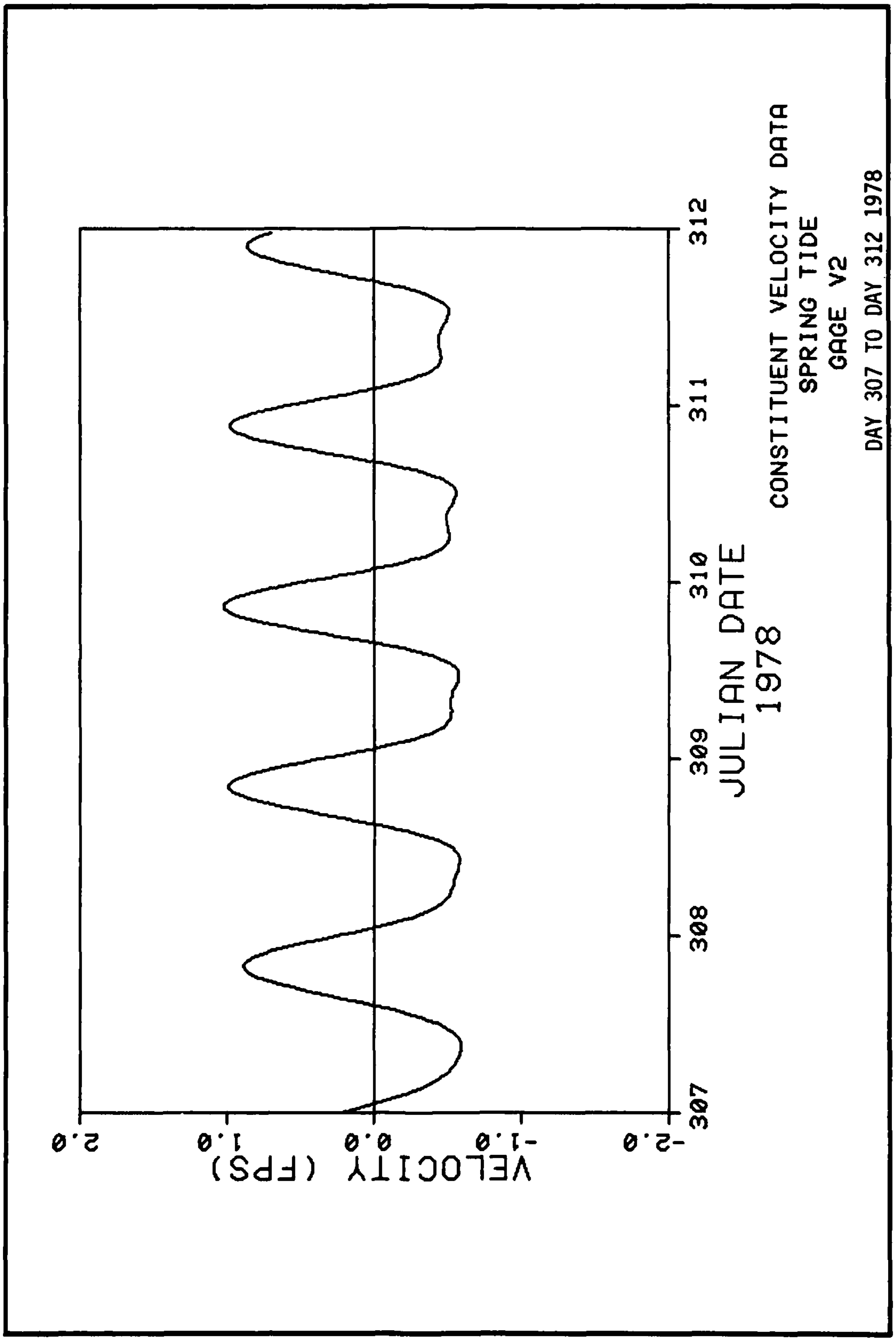

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V2
DAY 307 TO DAY 312 1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
307
308
309
310
311
312
JULIAN DATE
1978

PLATE E143

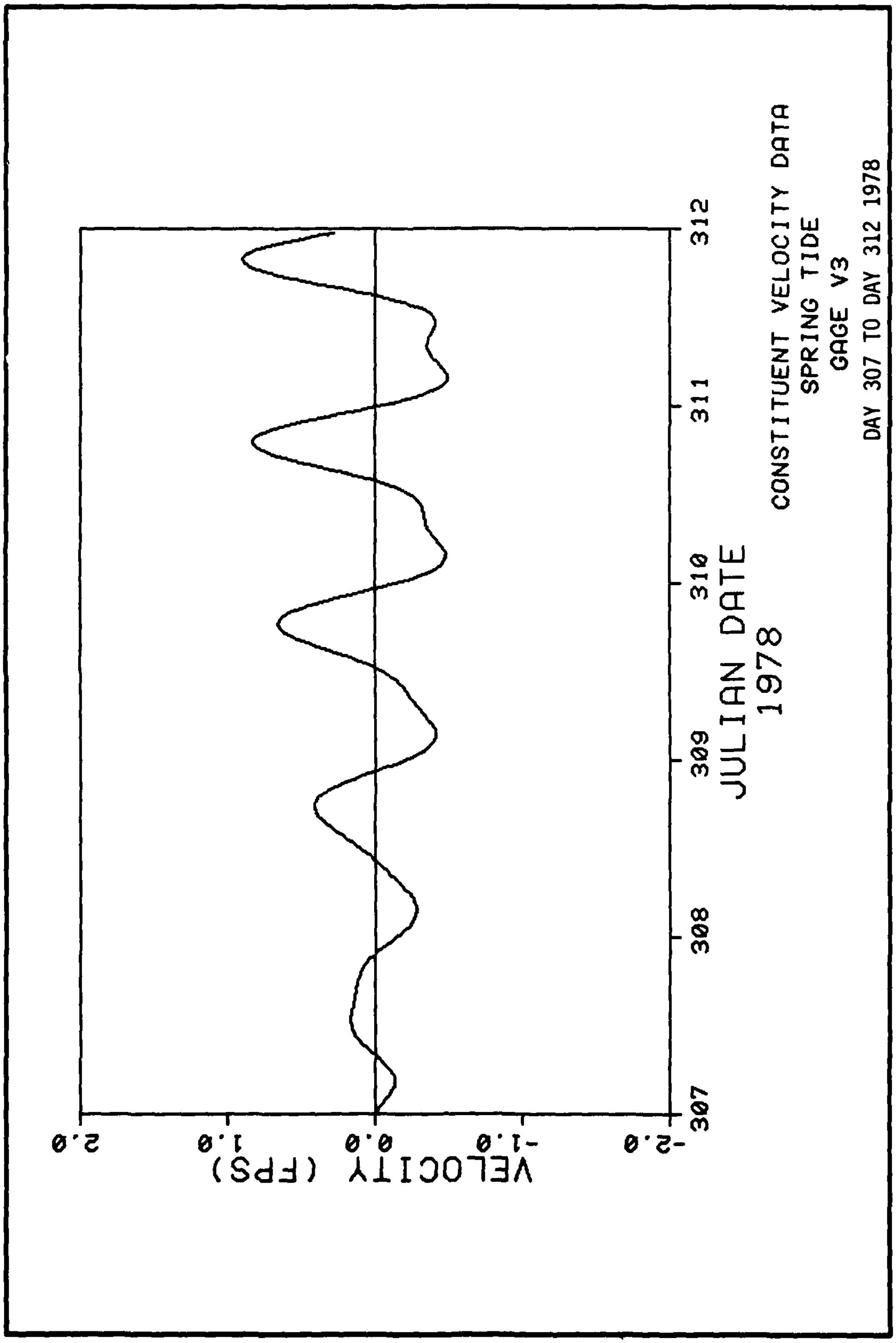
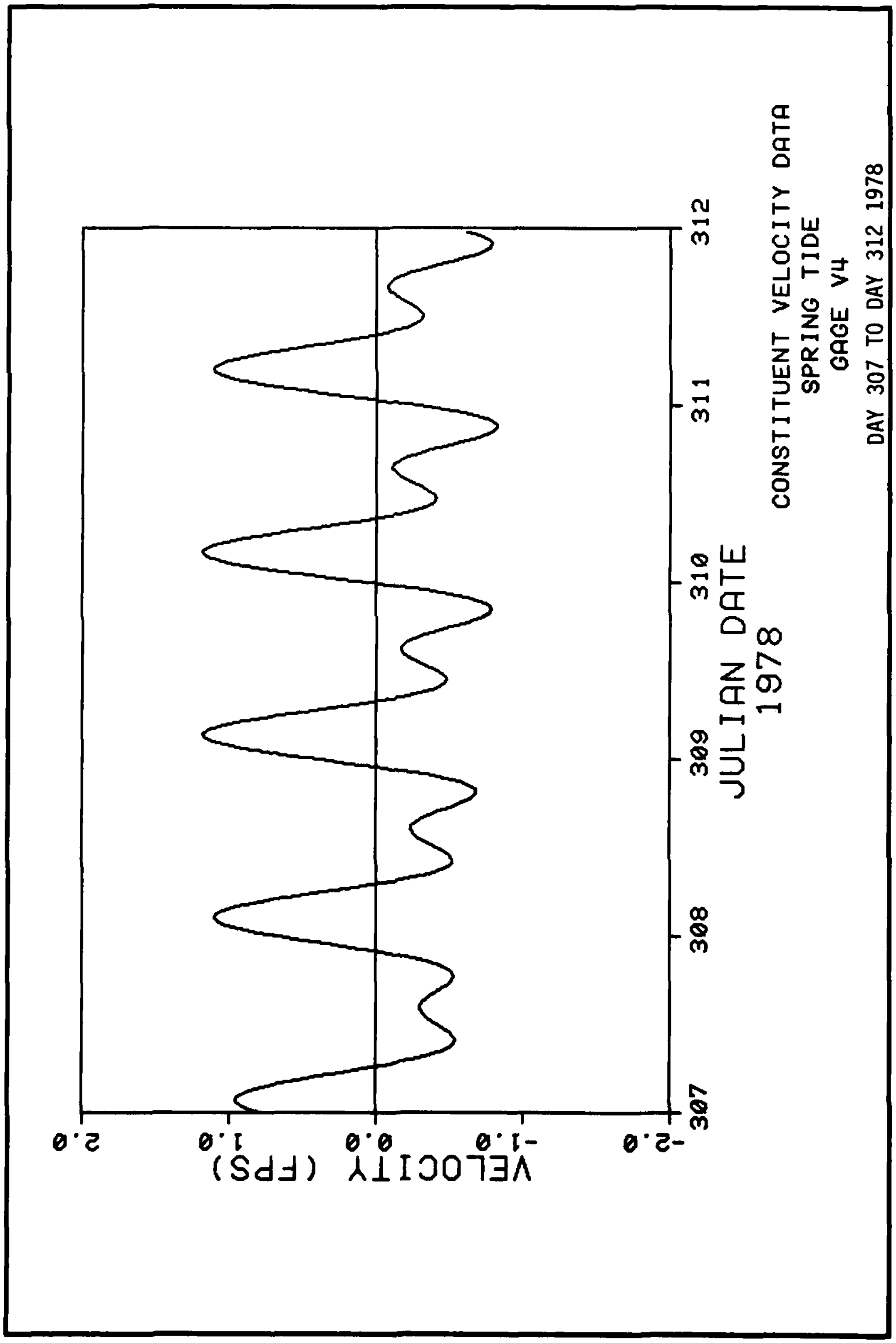
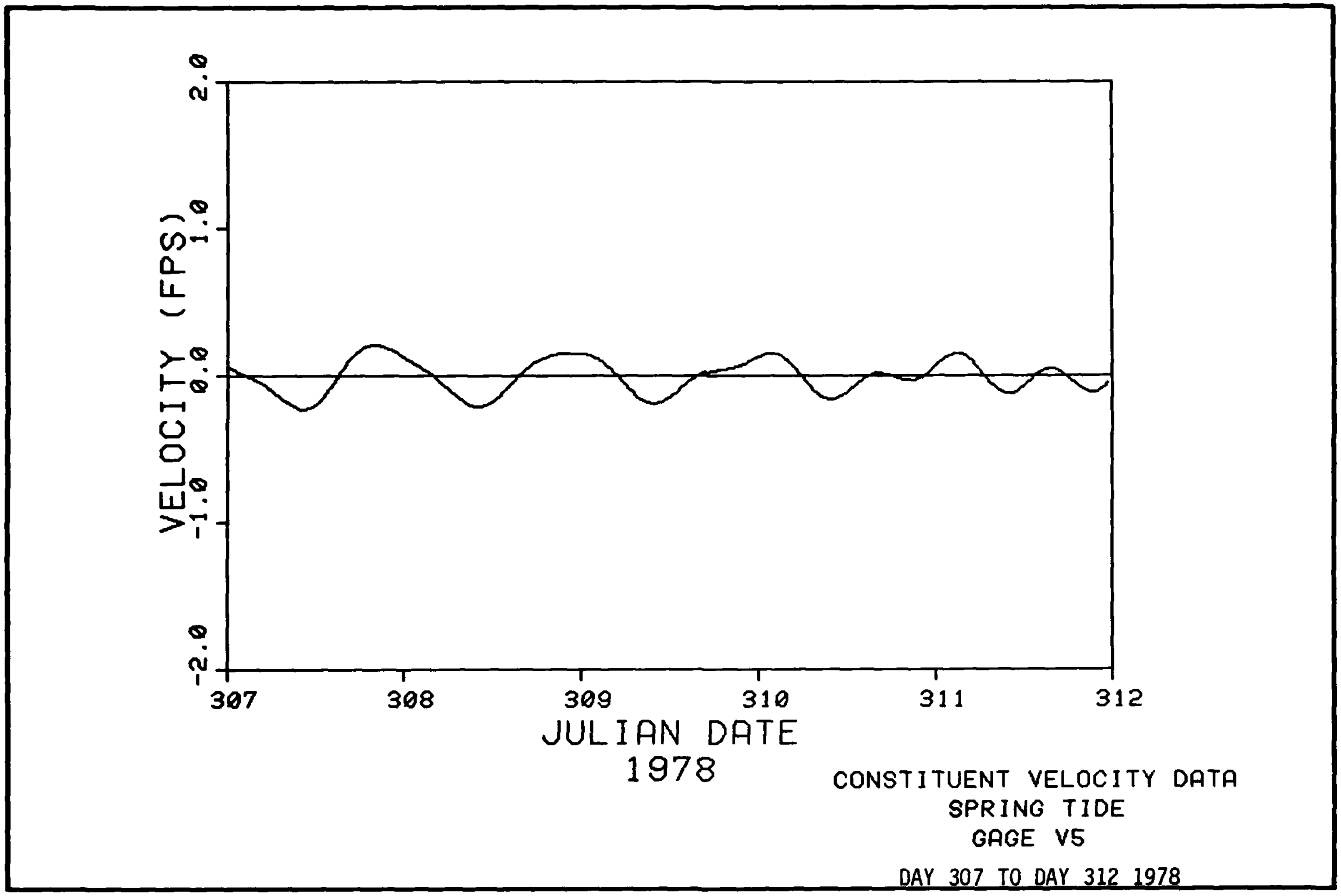

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V3
DAY 307 TO DAY 312 1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
307
308
309
310
311
312
JULIAN DATE
1978

PLATE E144



CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V4
DAY 307 TO DAY 312 1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
307
308
309
310
311
312
JULIAN DATE
1978

PLATE E145



VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
307
308
309
310
311
312
JULIAN DATE
1978
CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V5
DAY 307 TO DAY 312 1978

PLATE E146

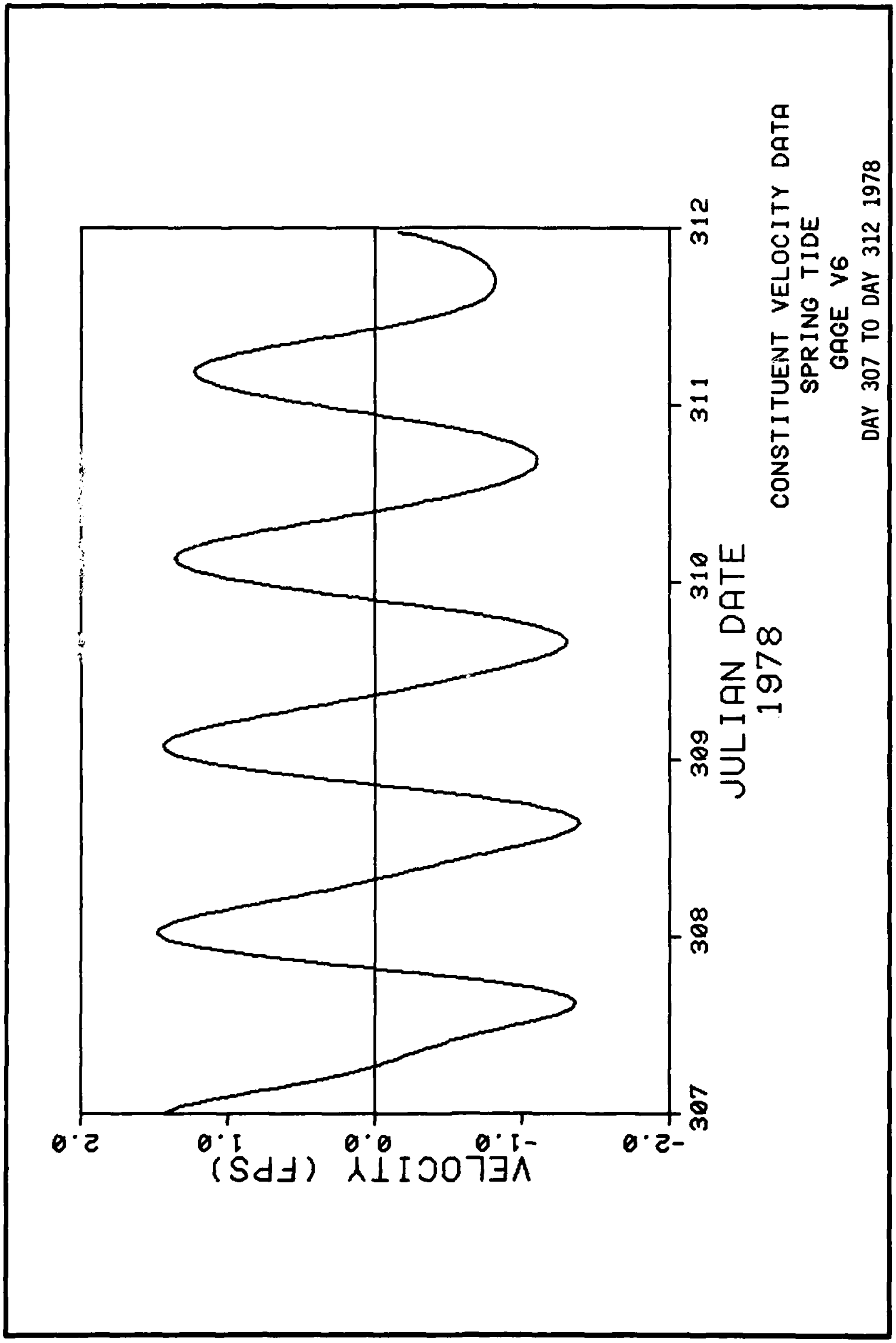
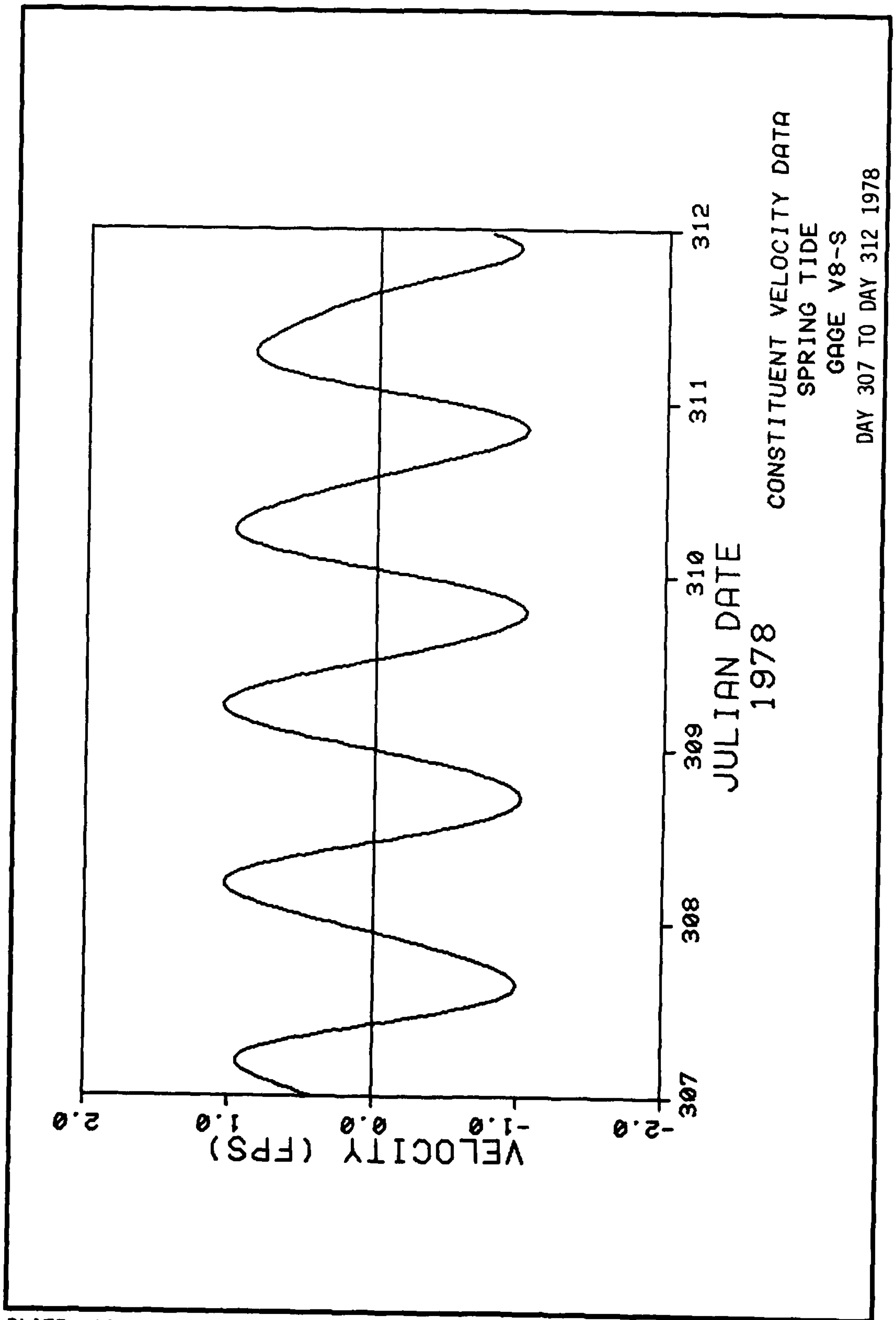

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V6
DAY 307 TO DAY 312 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
307
308
309
310
311
312

PLATE E147



CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V8-S
DAY 307 TO DAY 312 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
307
308
309
310
311
312

PLATE E148

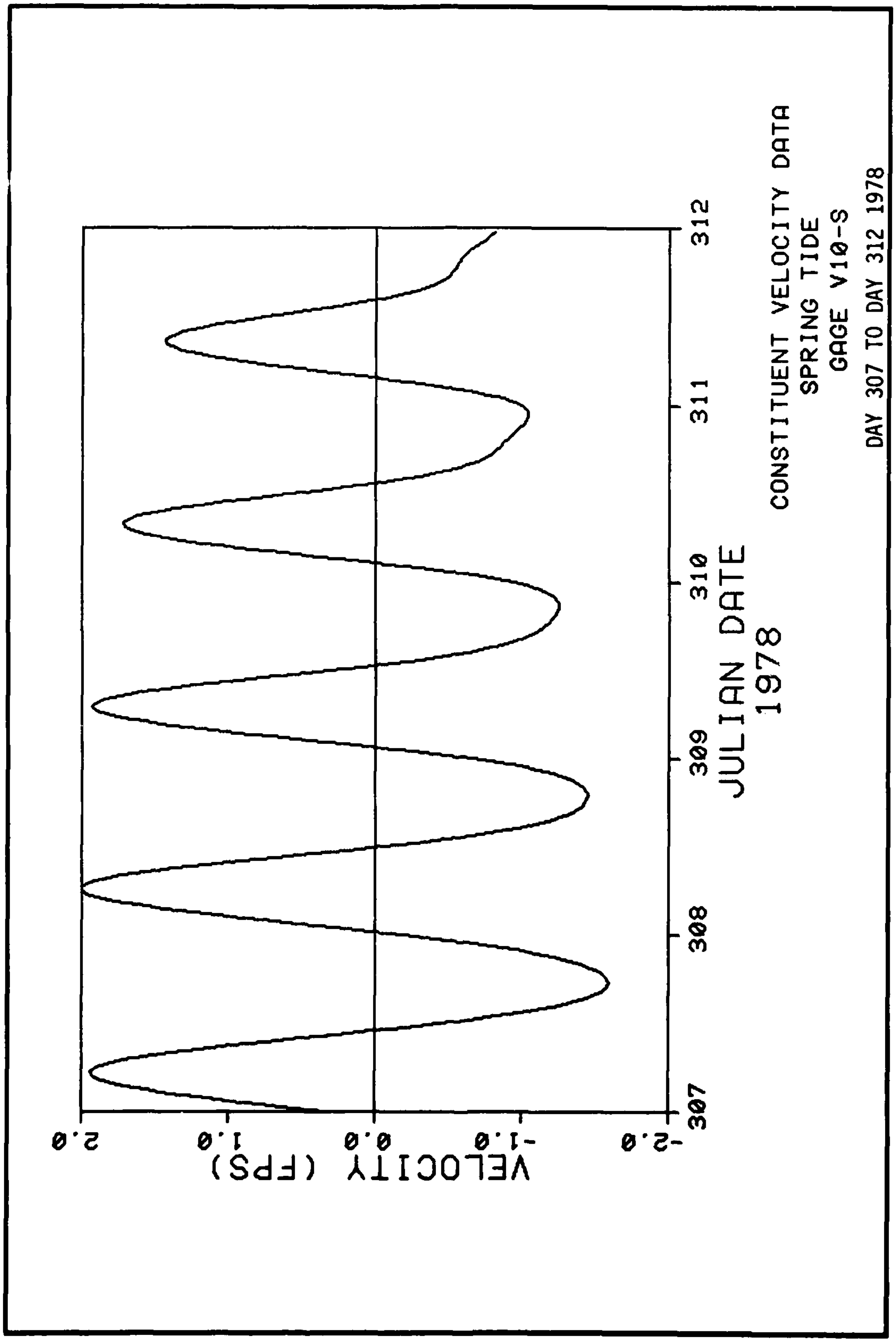

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V10-S
DAY 307 TO DAY 312 1978
JULIAN DATE
1978
307
308
309
310
311
312
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0

PLATE E149

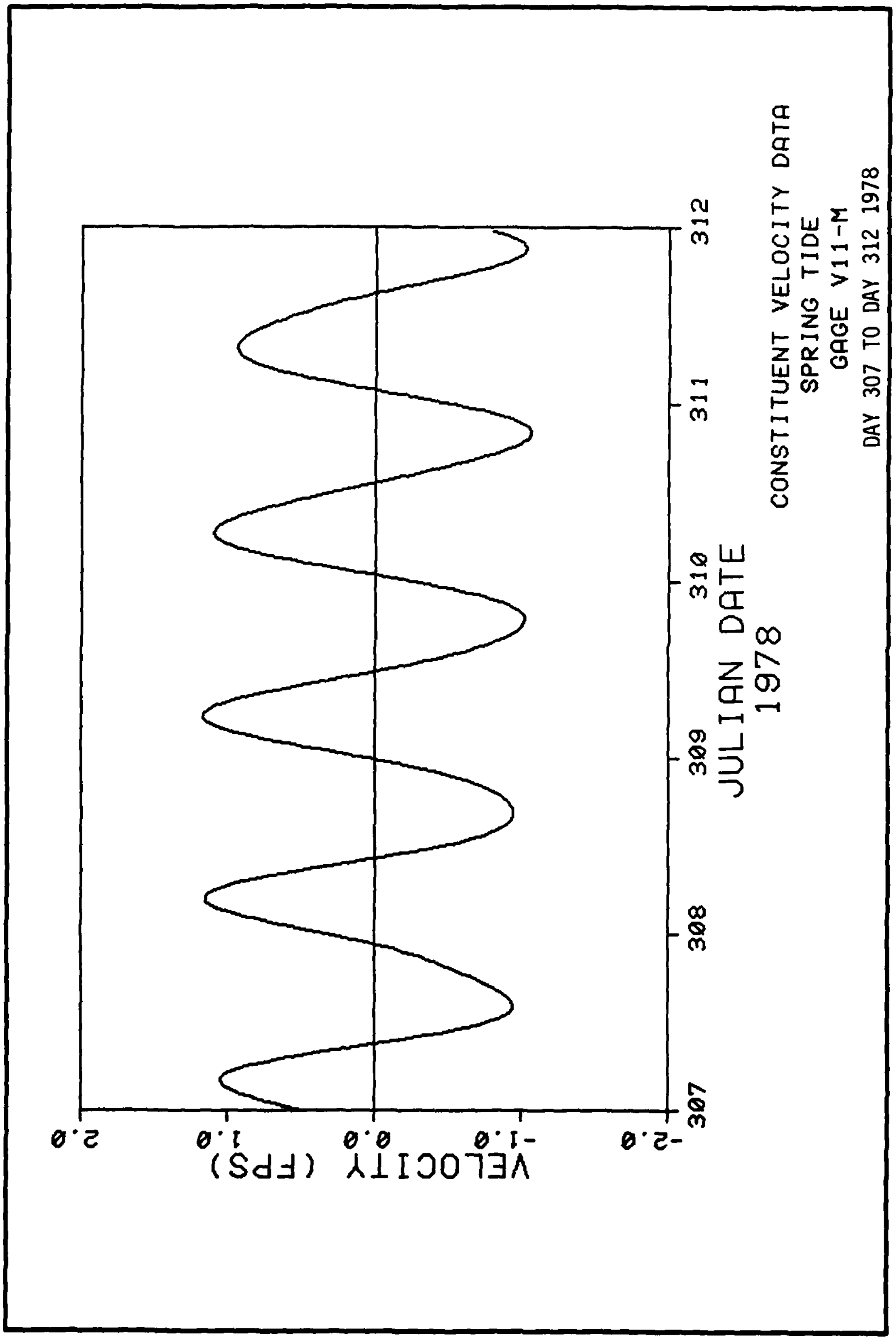
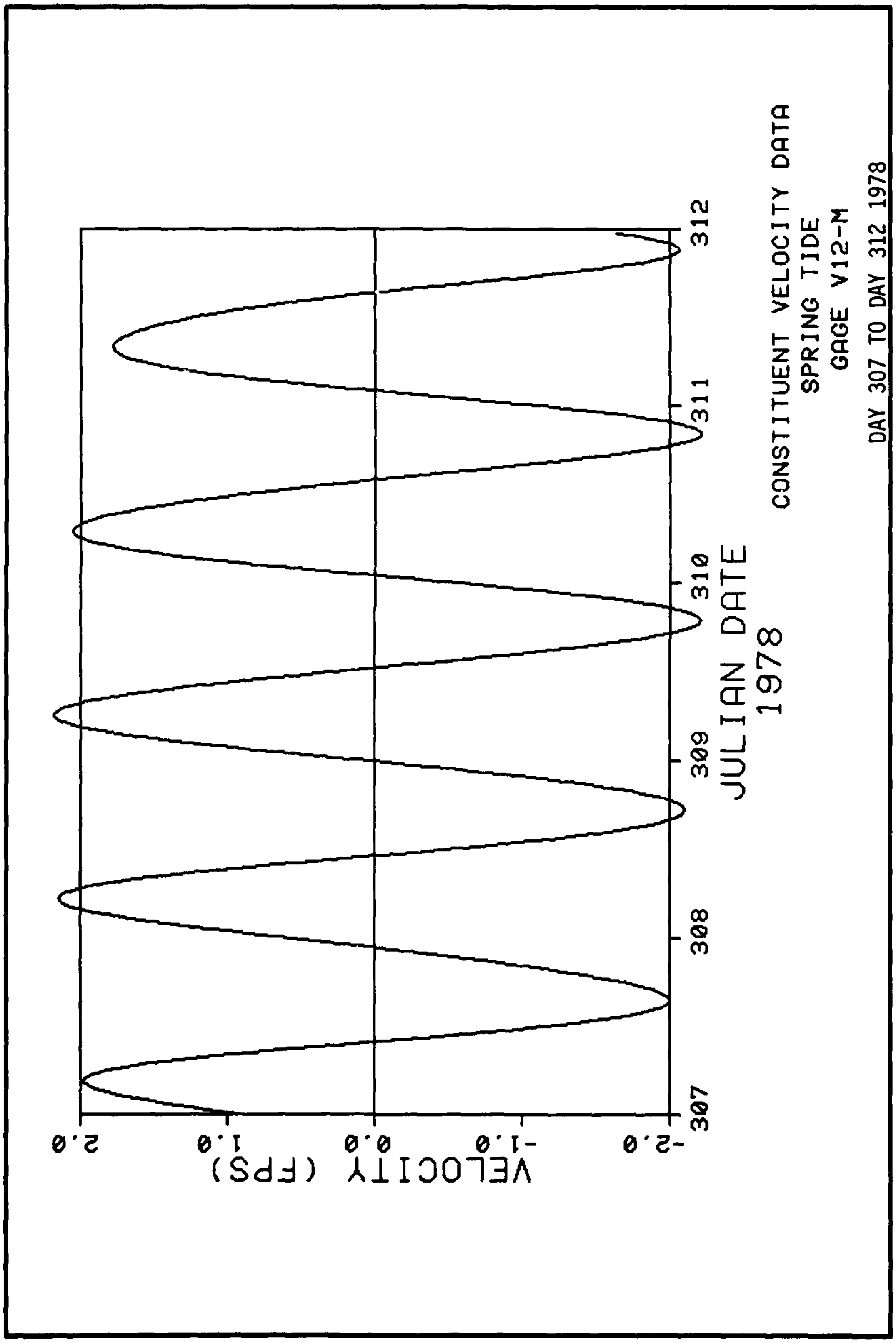

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V11-M
DAY 307 TO DAY 312 1978
JULIAN DATE
1978
VELOCITY (FPS)
-2.0
-1.0
0.0
1.0
2.0
307
308
309
310
311
312

PLATE E150



CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V12-M
DAY 307 TO DAY 312 1978
JULIAN DATE
1978
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
307
308
309
310
311
312

PLATE E151

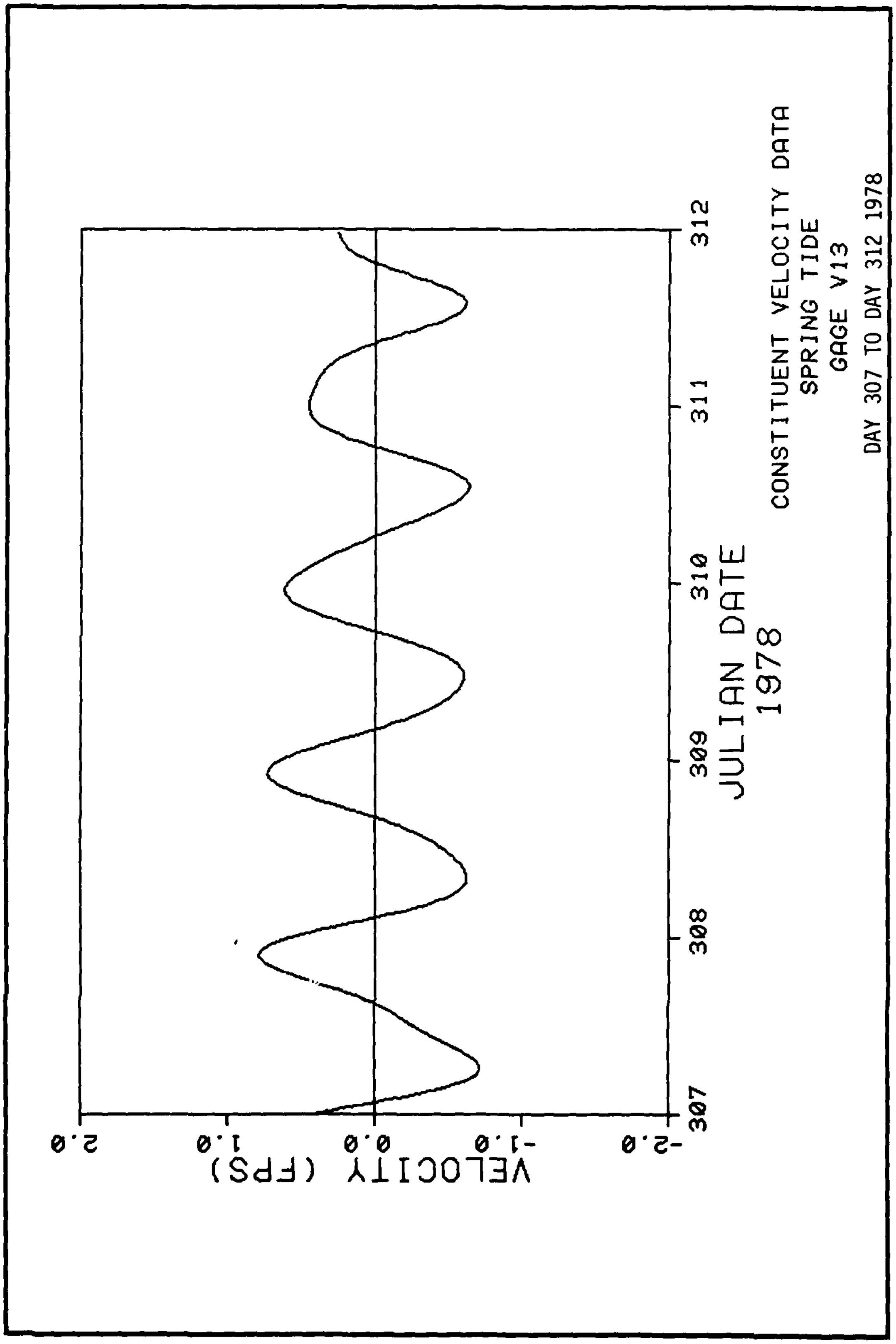
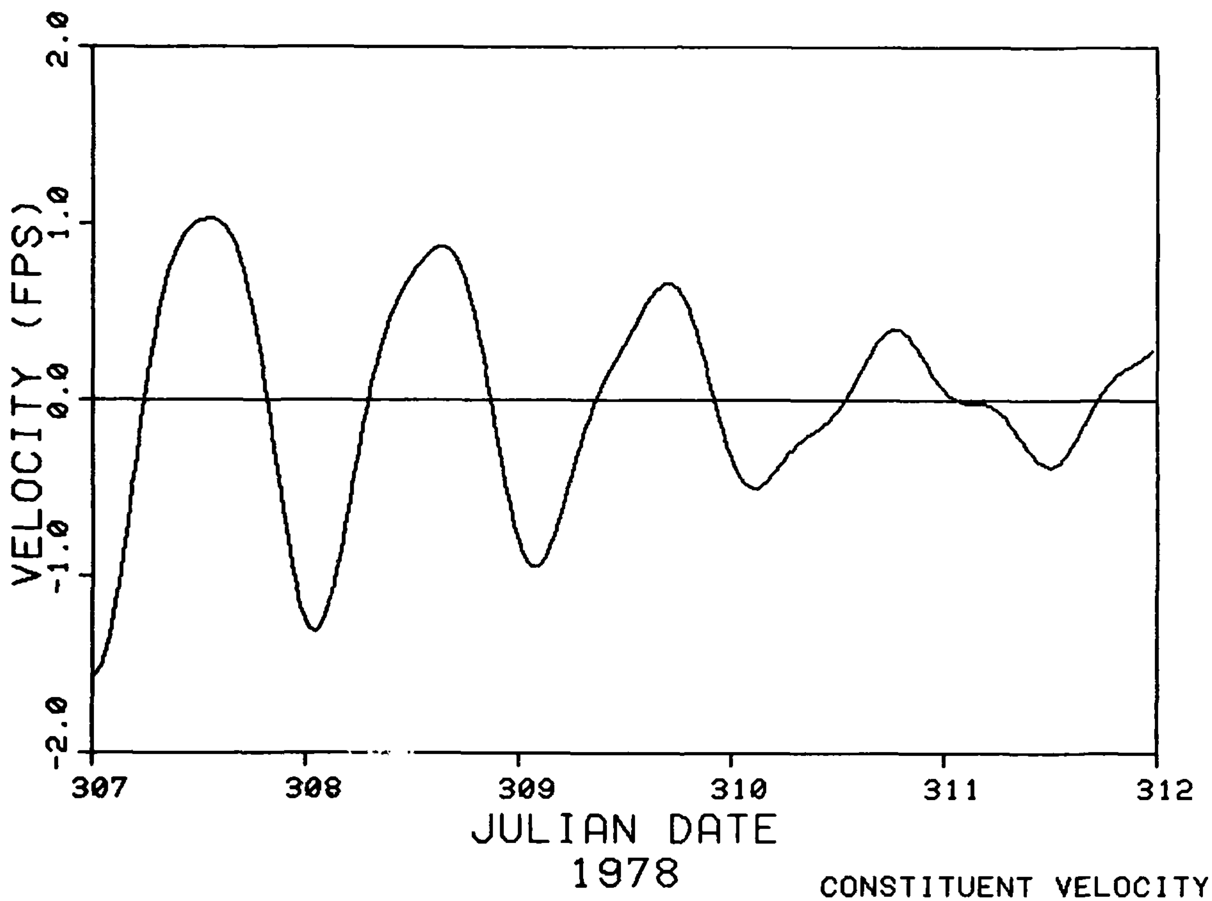
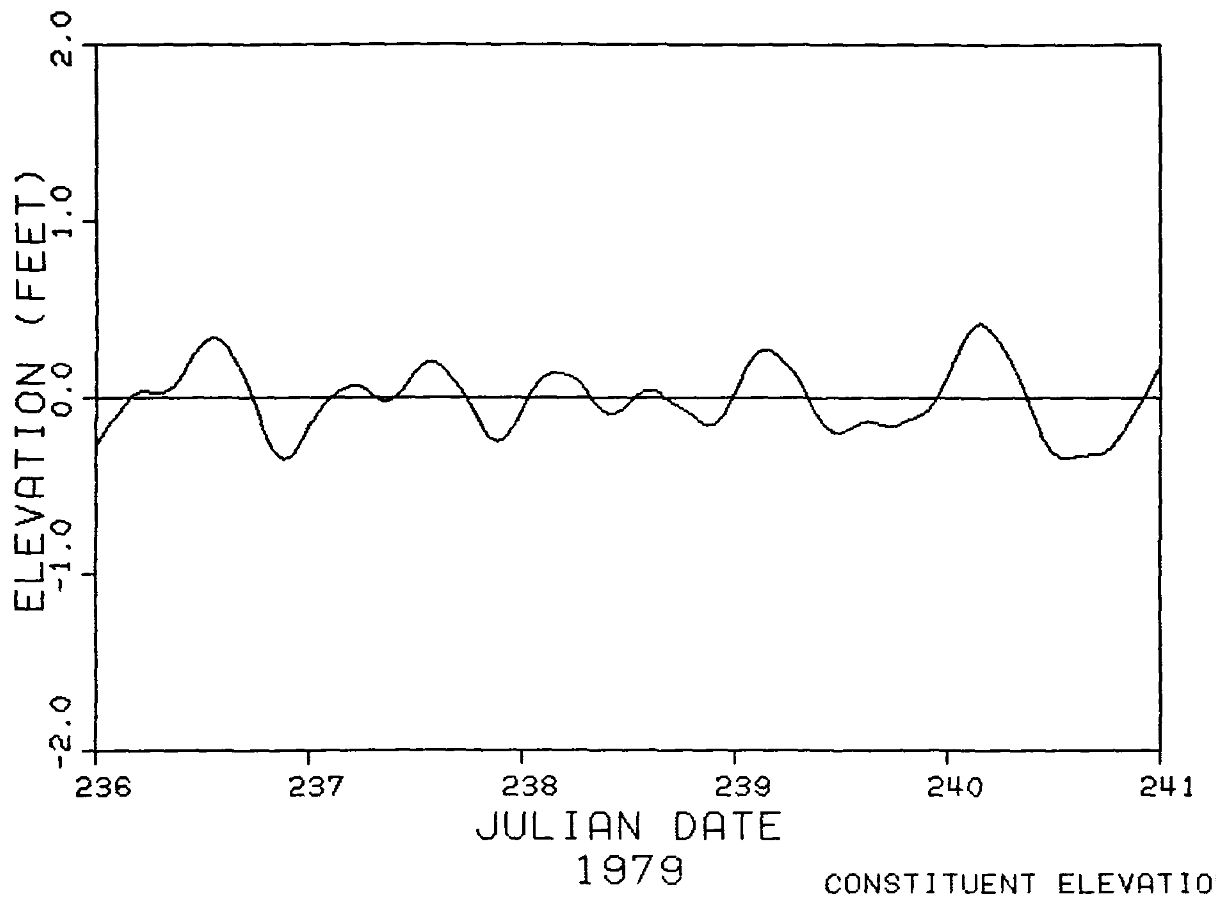

CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V13
DAY 307 TO DAY 312 1978
JULIAN DATE
1978
307
308
309
310
311
312
VELOCITY (FPS)
-2.0
-1.0
0.0
1.0
2.0

PLATE E152



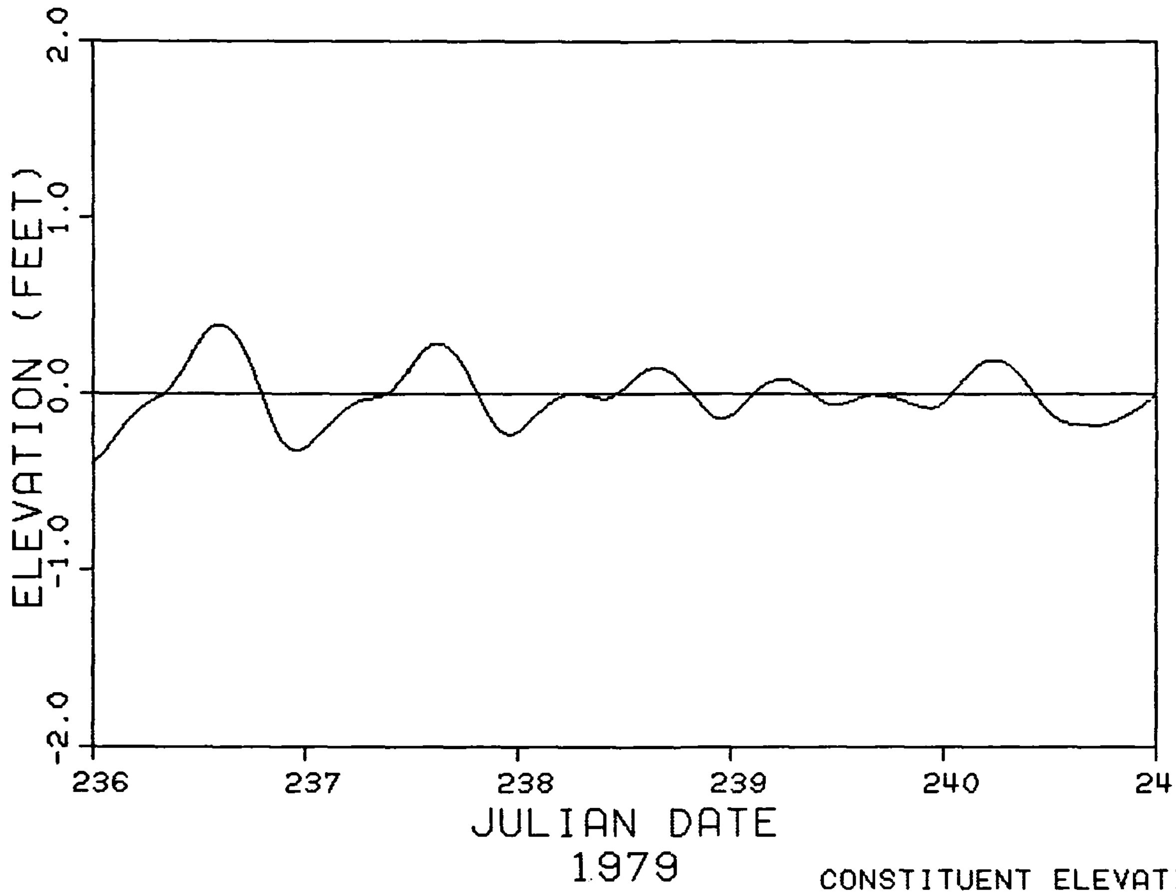
CONSTITUENT VELOCITY DATA
SPRING TIDE
GAGE V21-S
DAY 307 TO DAY 312 1978

PLATE E153



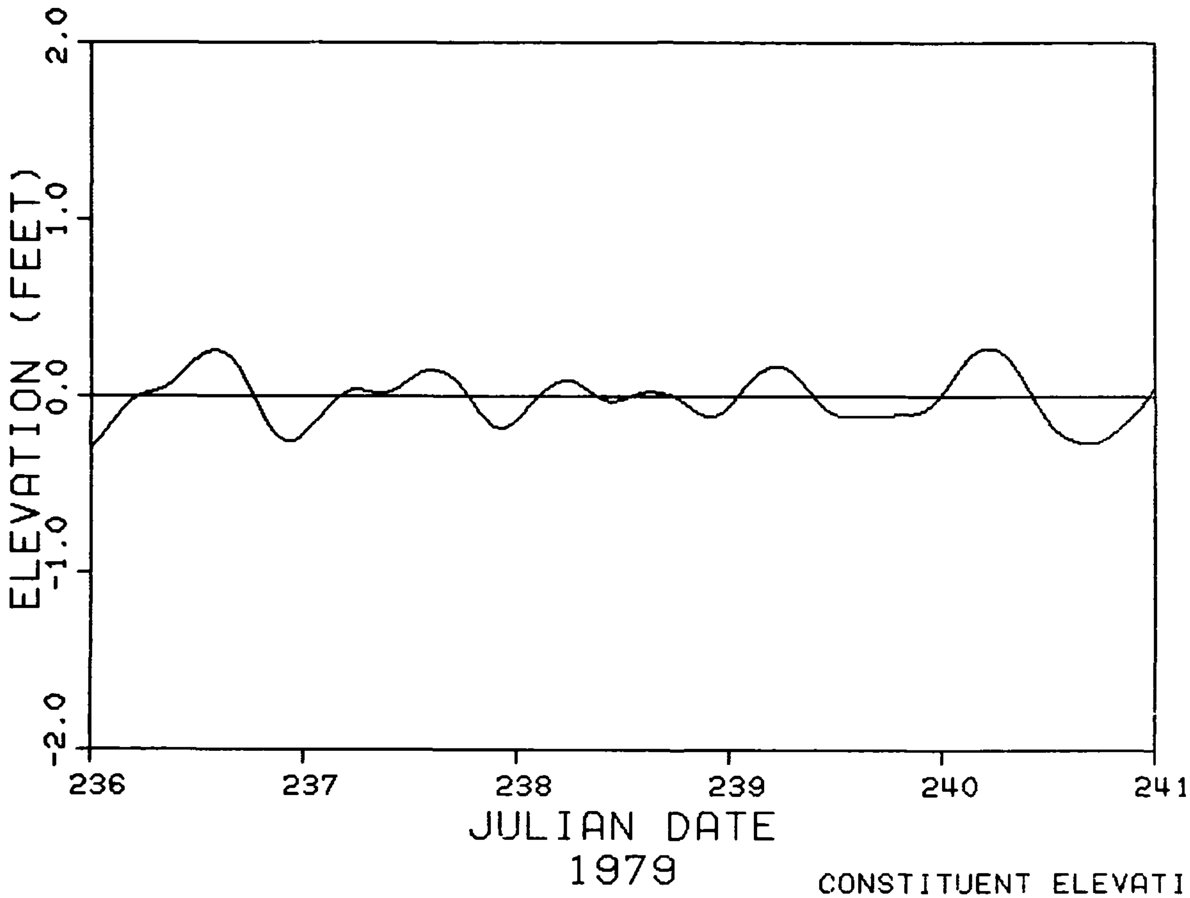
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE B-1
DAY 236 TO DAY 241 1979



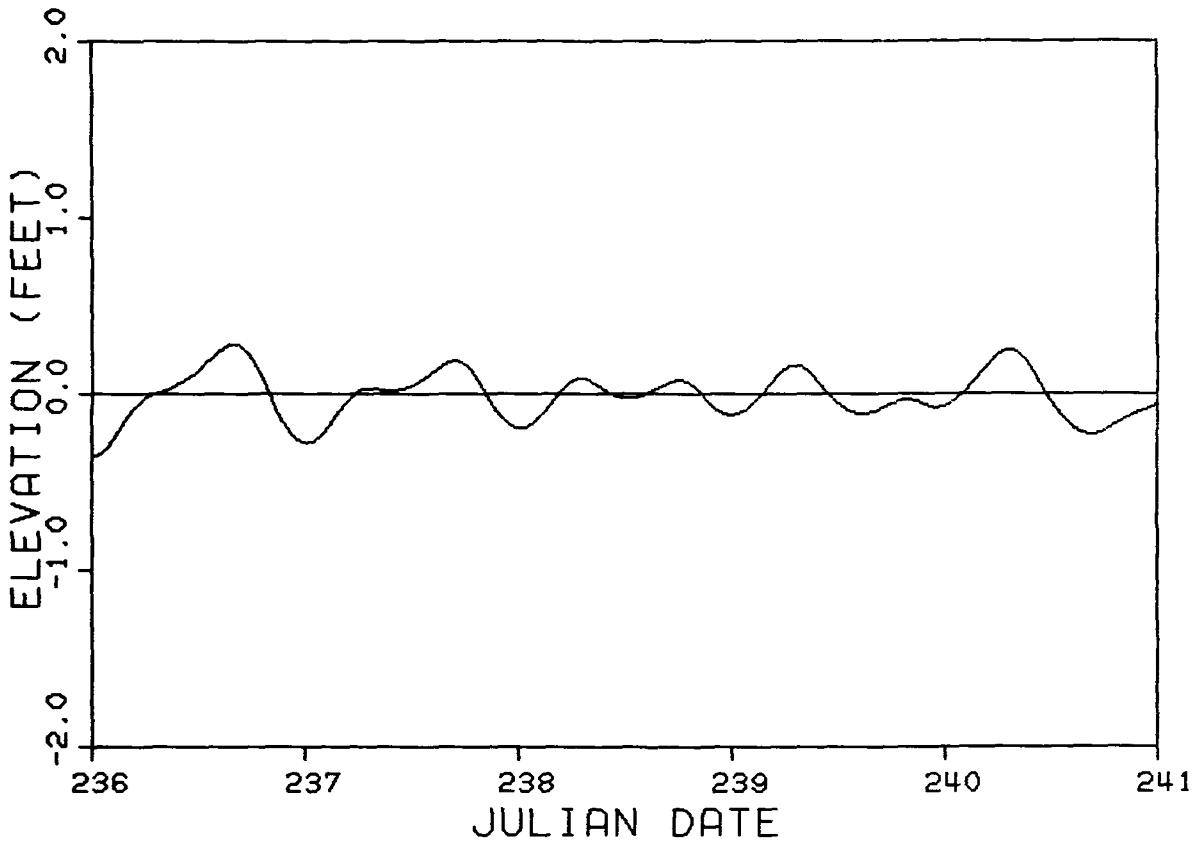
CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE B-2
DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



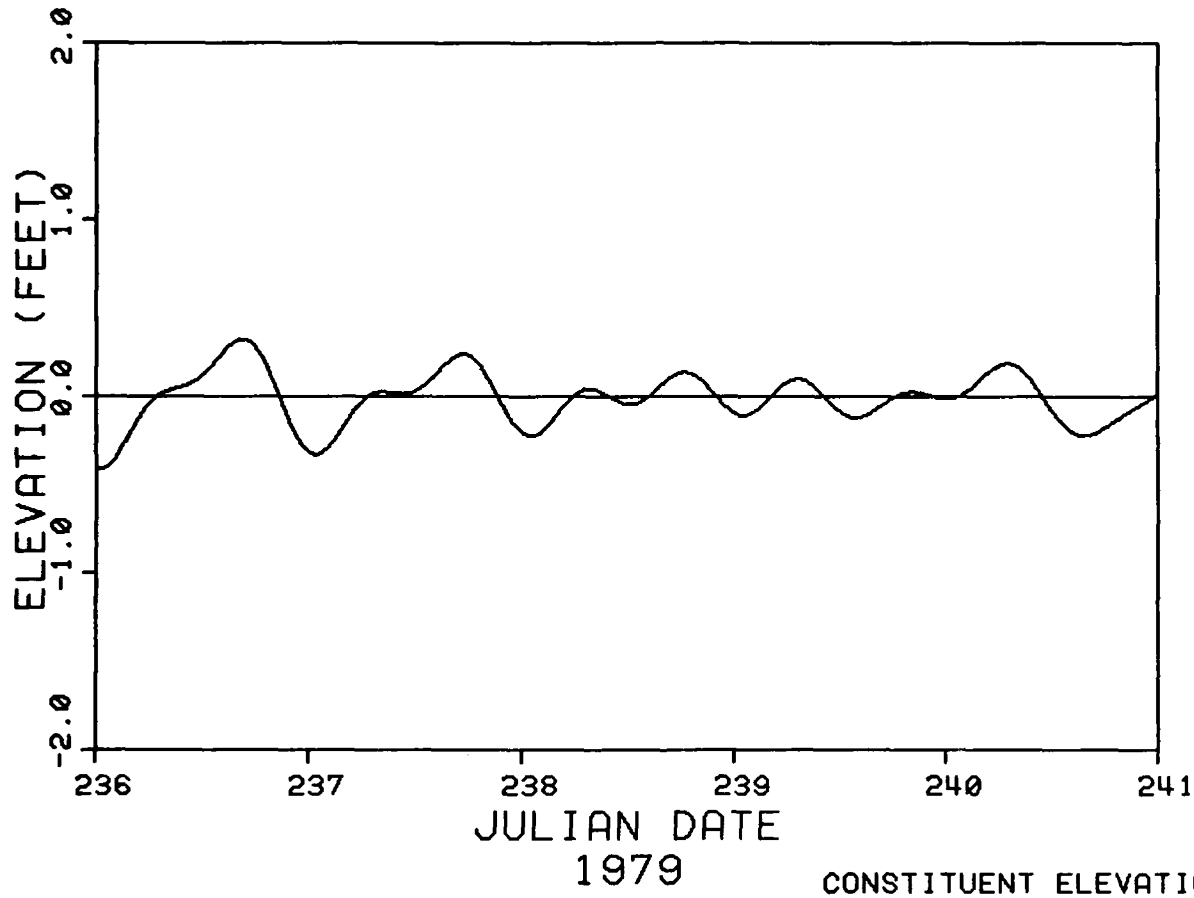
CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE B-3
DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



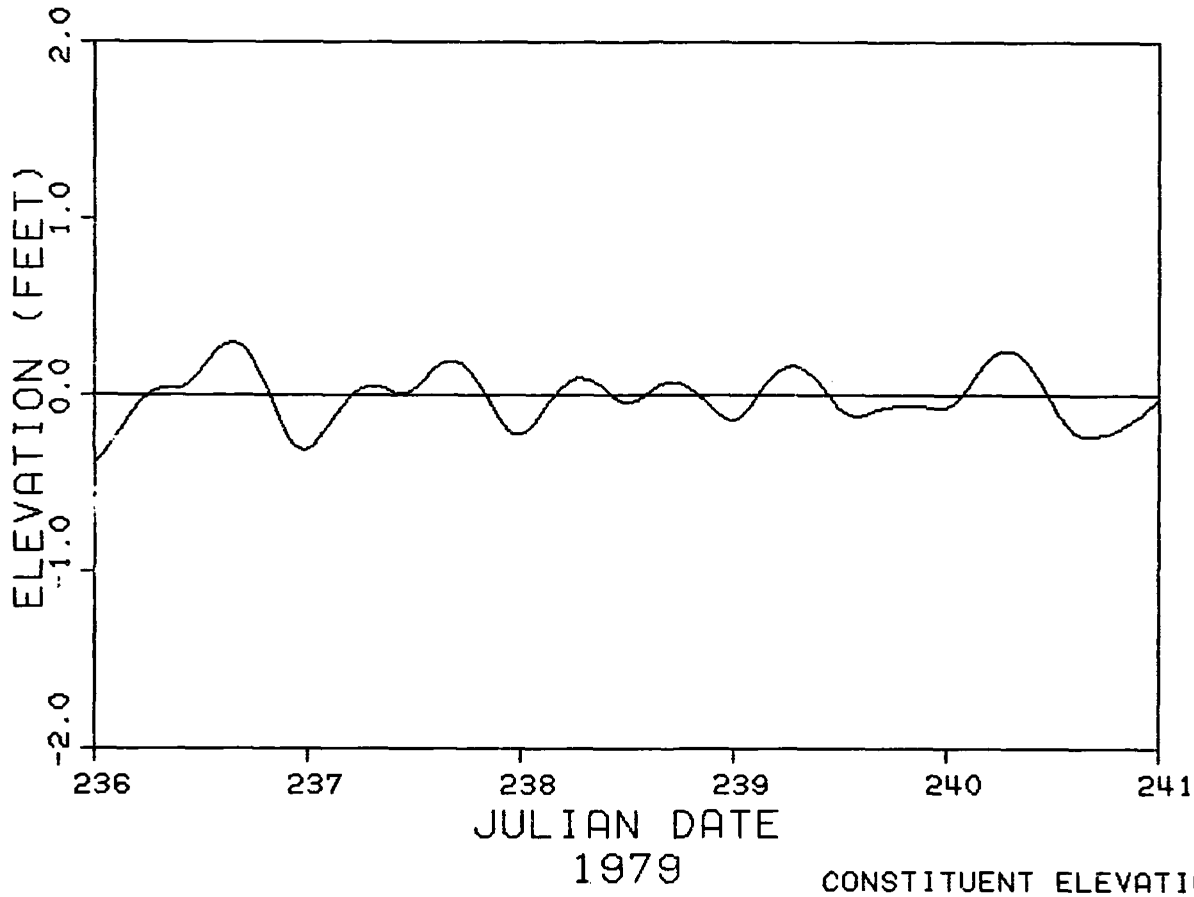
CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE B-4
DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

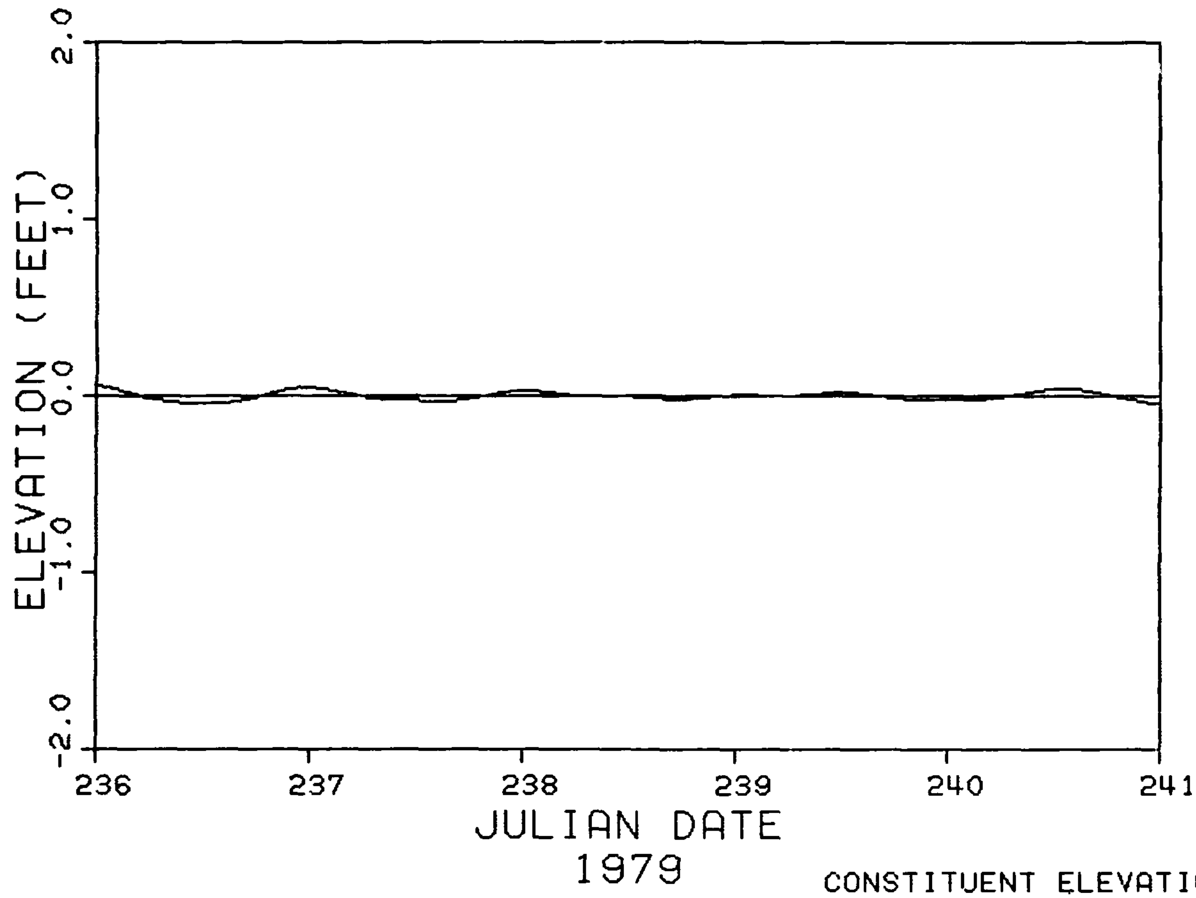
CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE B-5
DAY 236 TO DAY 241 1979



CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE B-6

DAY 236 TO DAY 241 1979

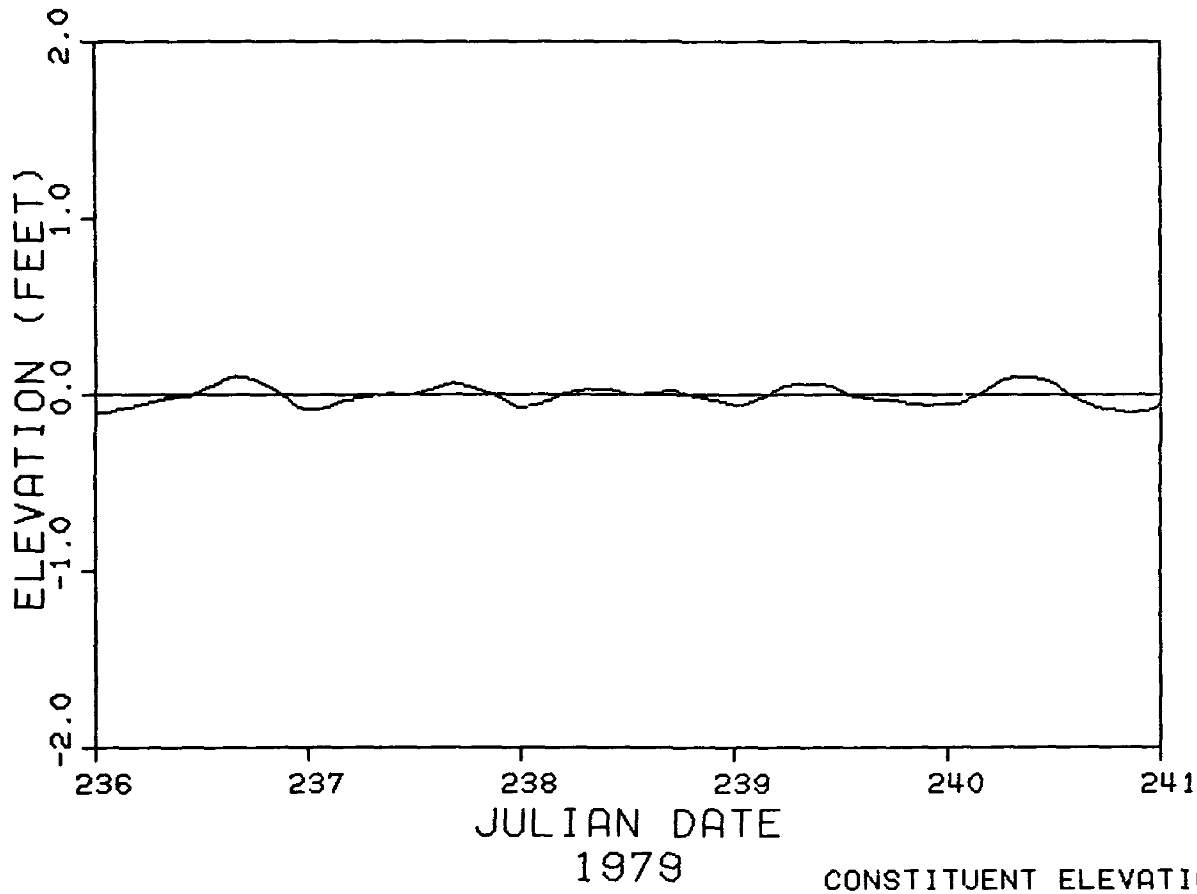
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE M-1

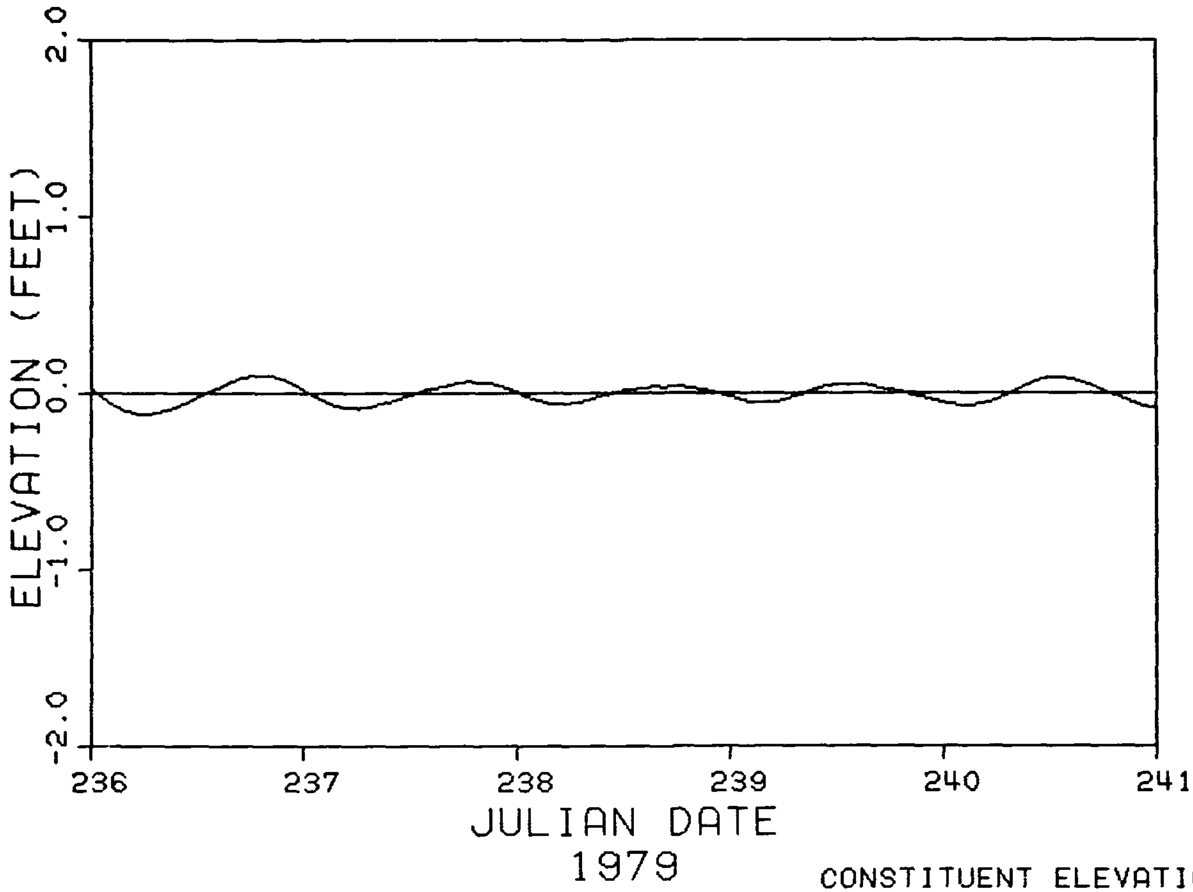
DAY 236 TO DAY 241 1979



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

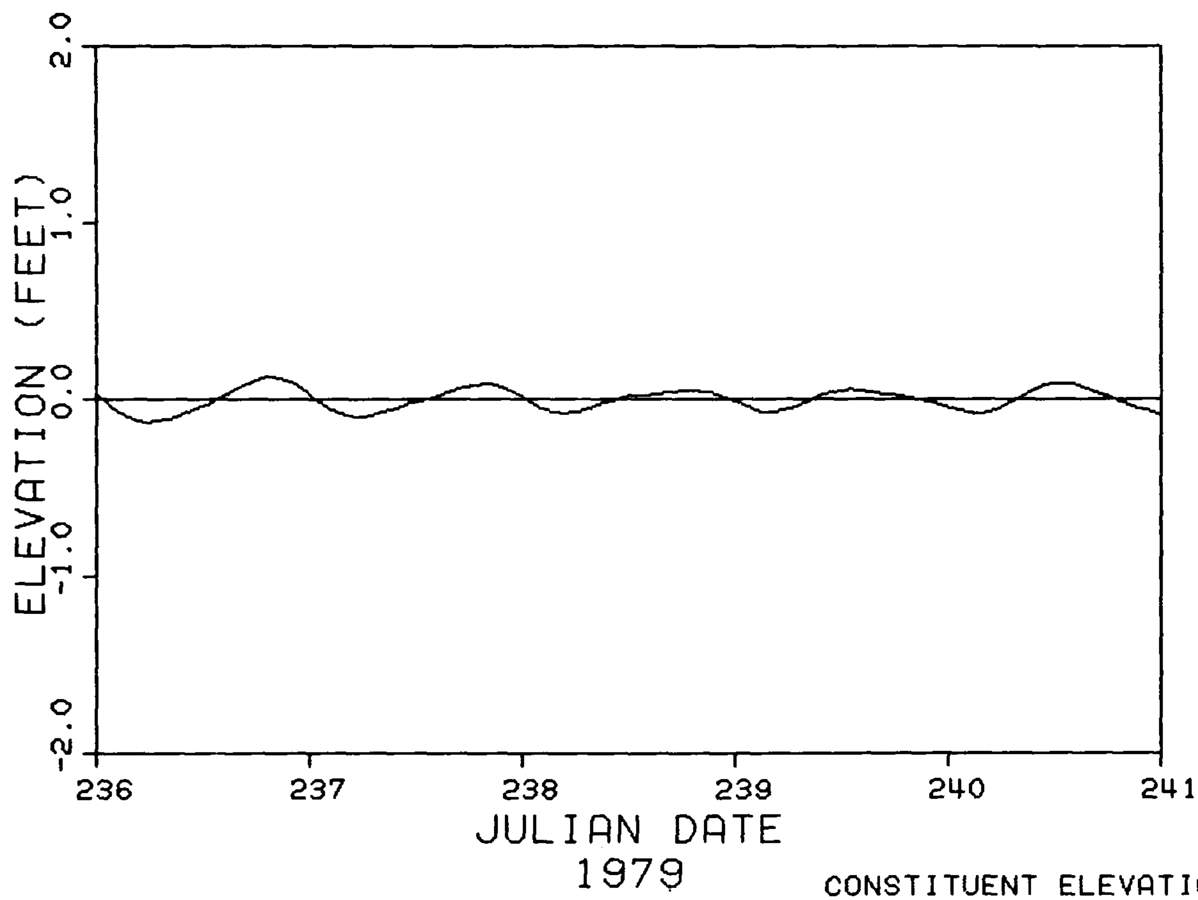
CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE P-1

DAY 236 TO DAY 241 1979



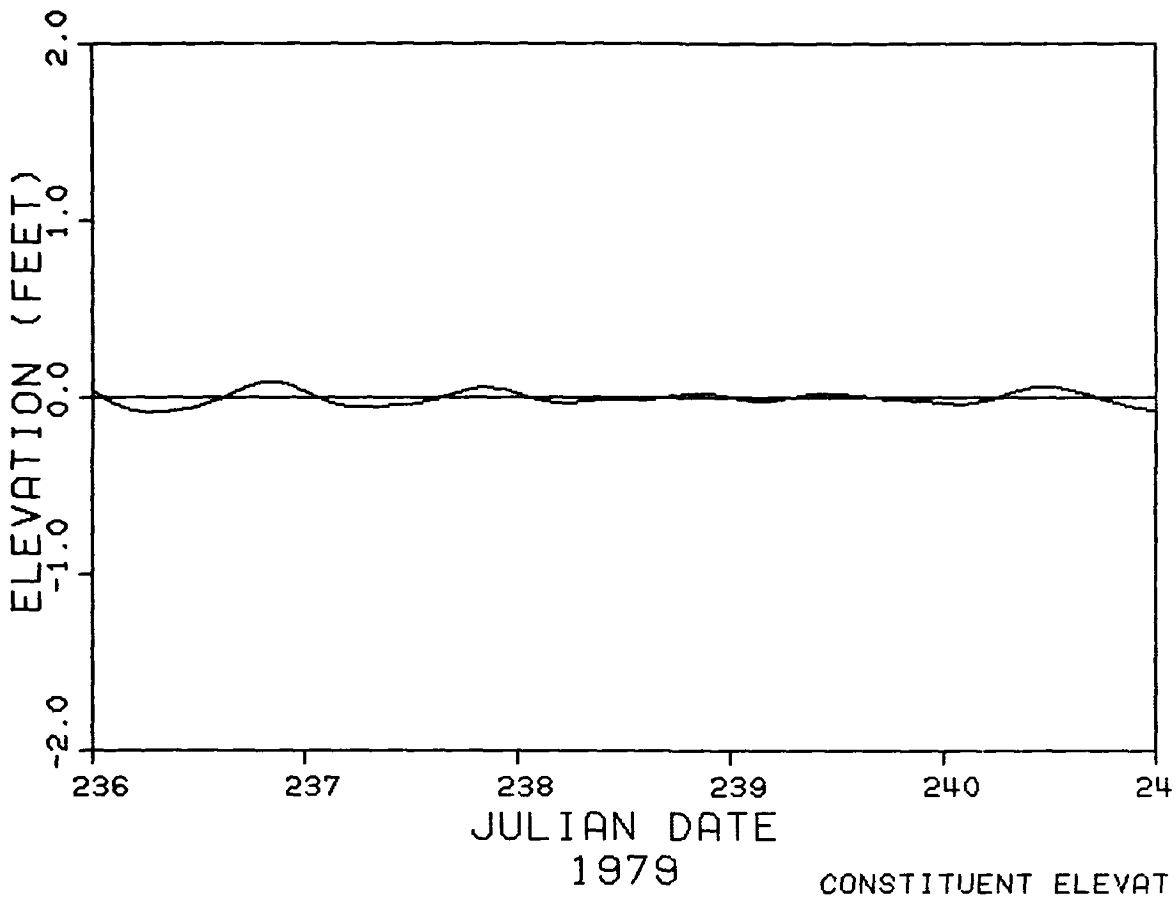
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE P-2
DAY 236 TO DAY 241 1979



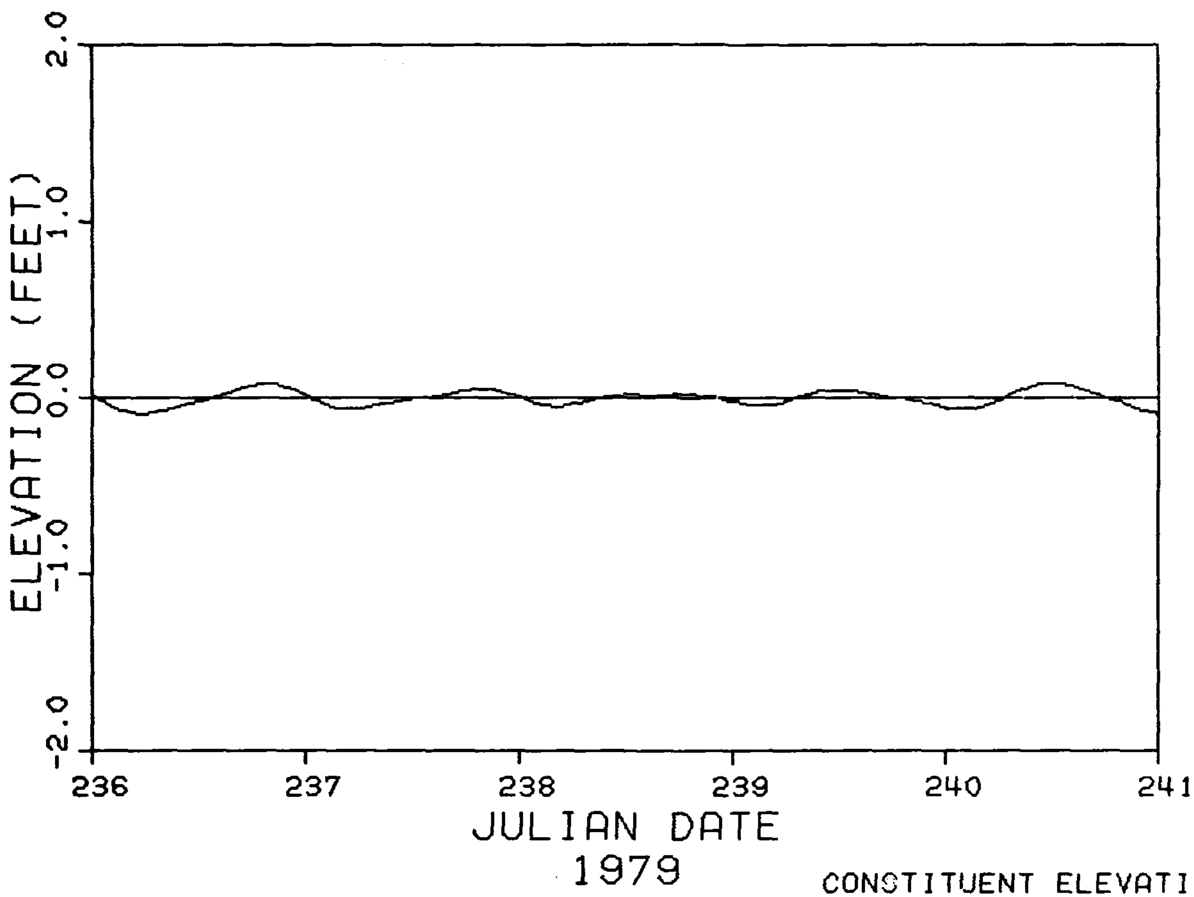
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE P-3
DAY 236 TO DAY 241 1979



NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE P-4
DAY 236 TO DAY 241 1979



CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE P-5

DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

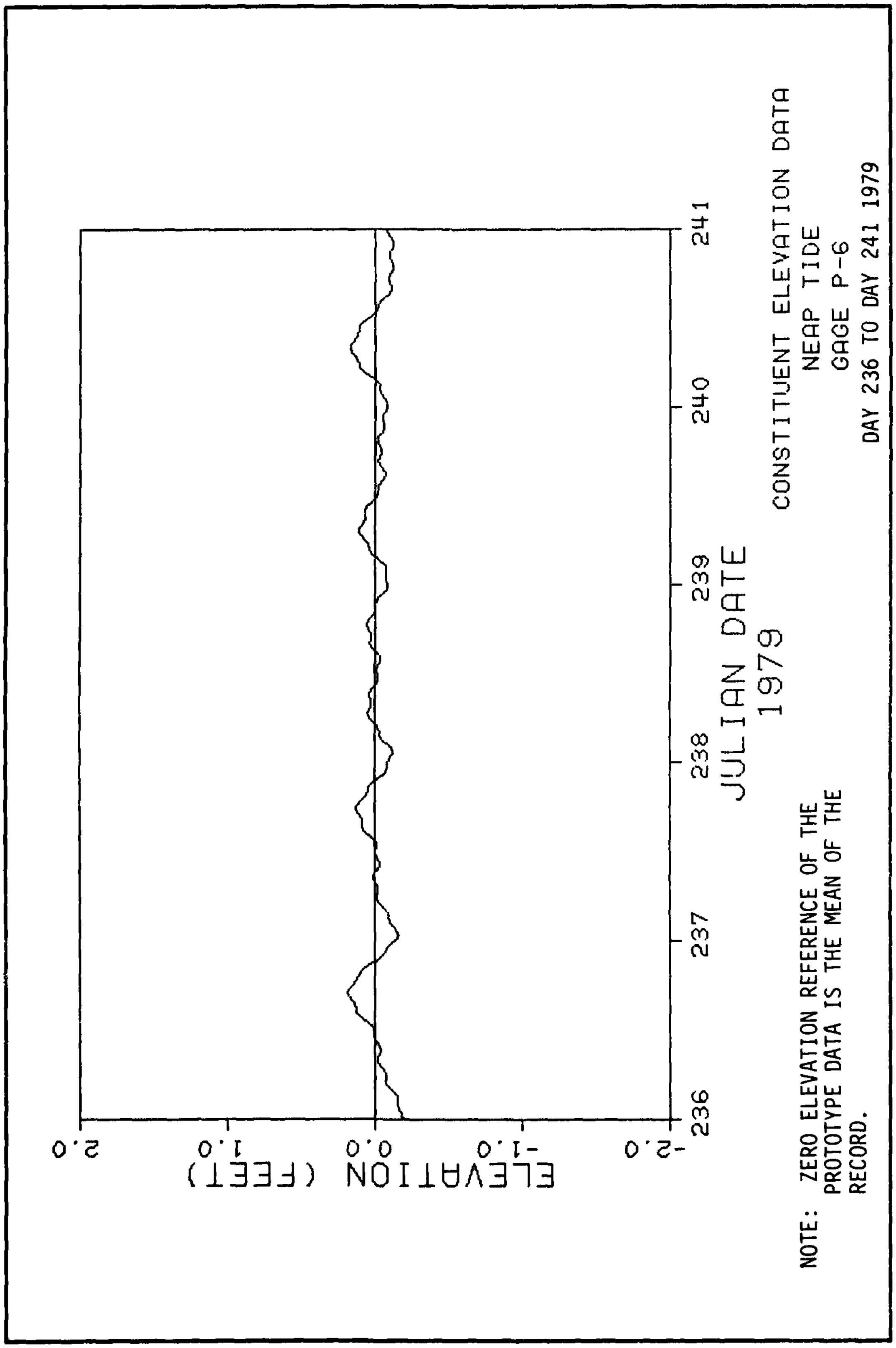
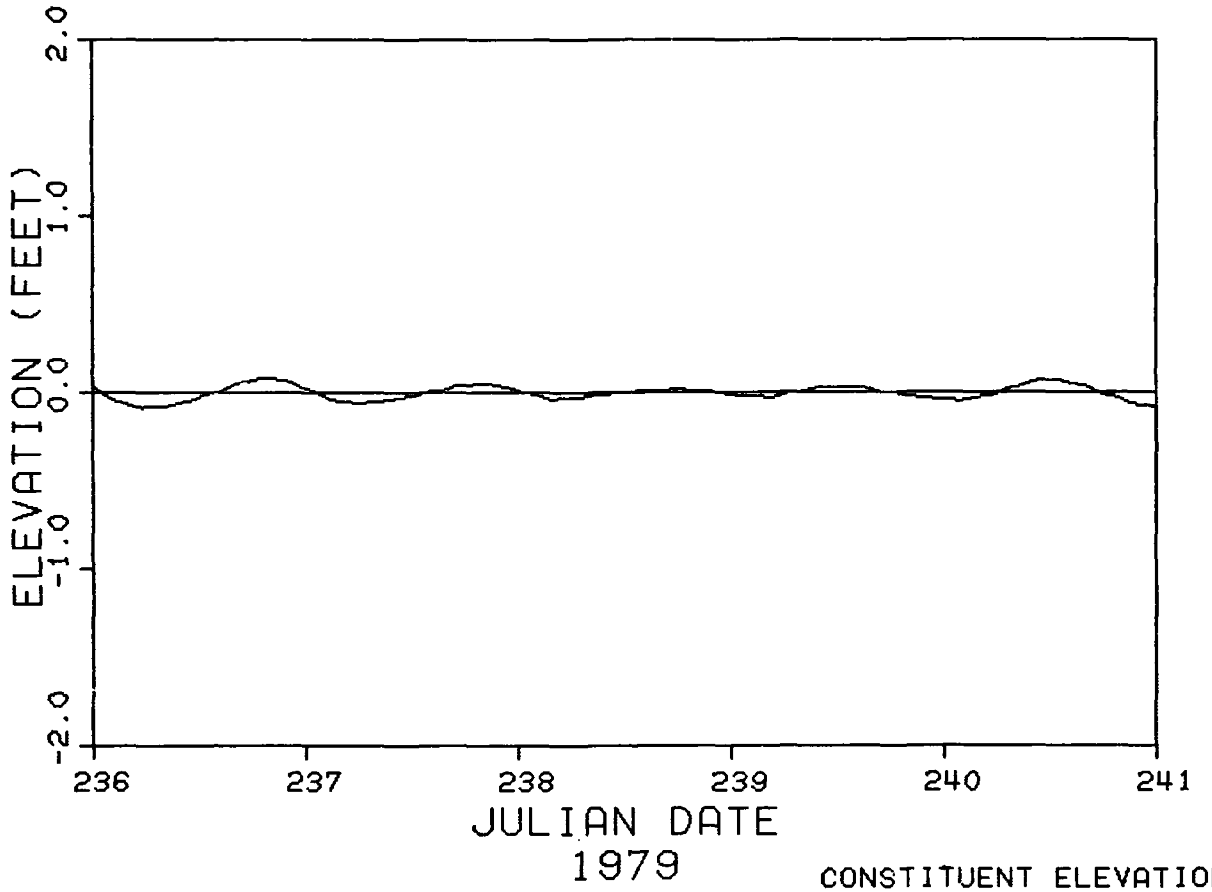

CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE P-6
DAY 236 TO DAY 241 1979
ELEVATION (FEET)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241
JULIAN DATE
1979
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

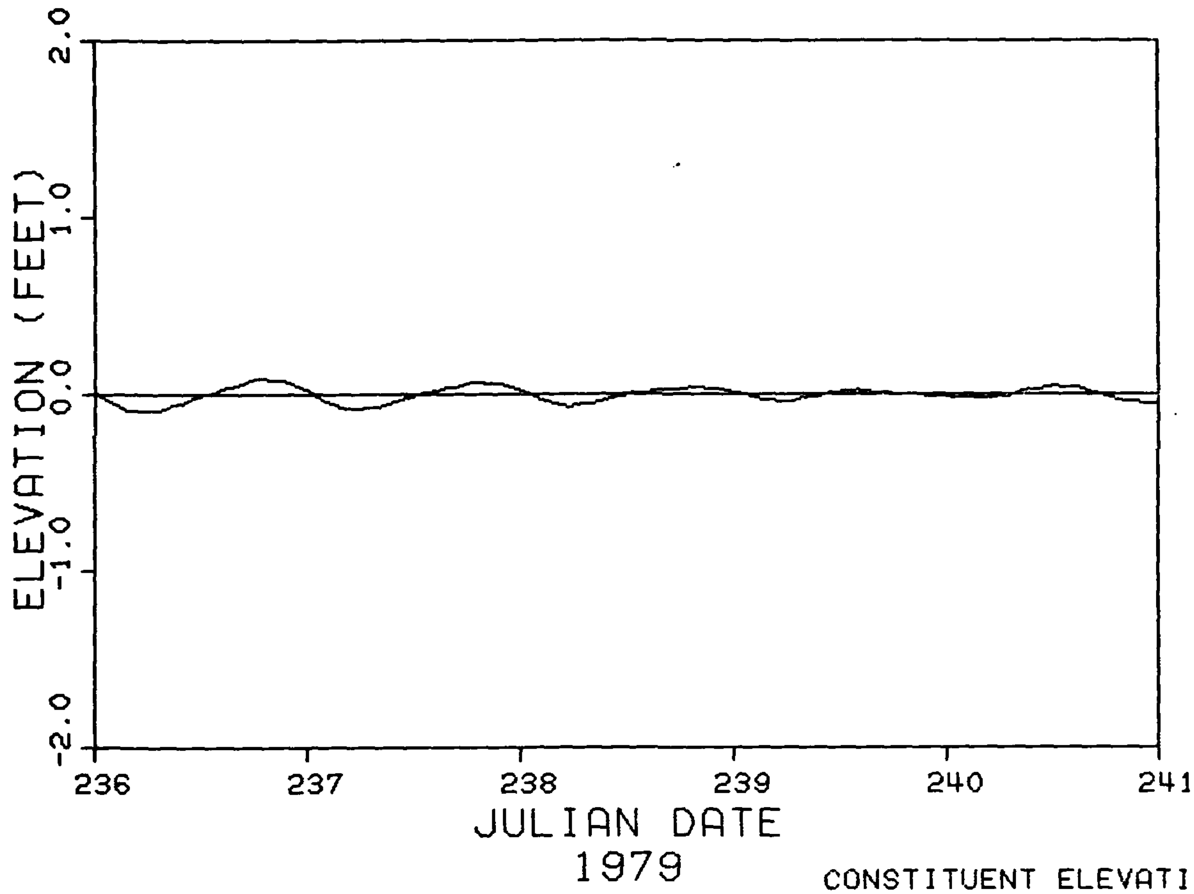
PLATE E166



CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE P-7

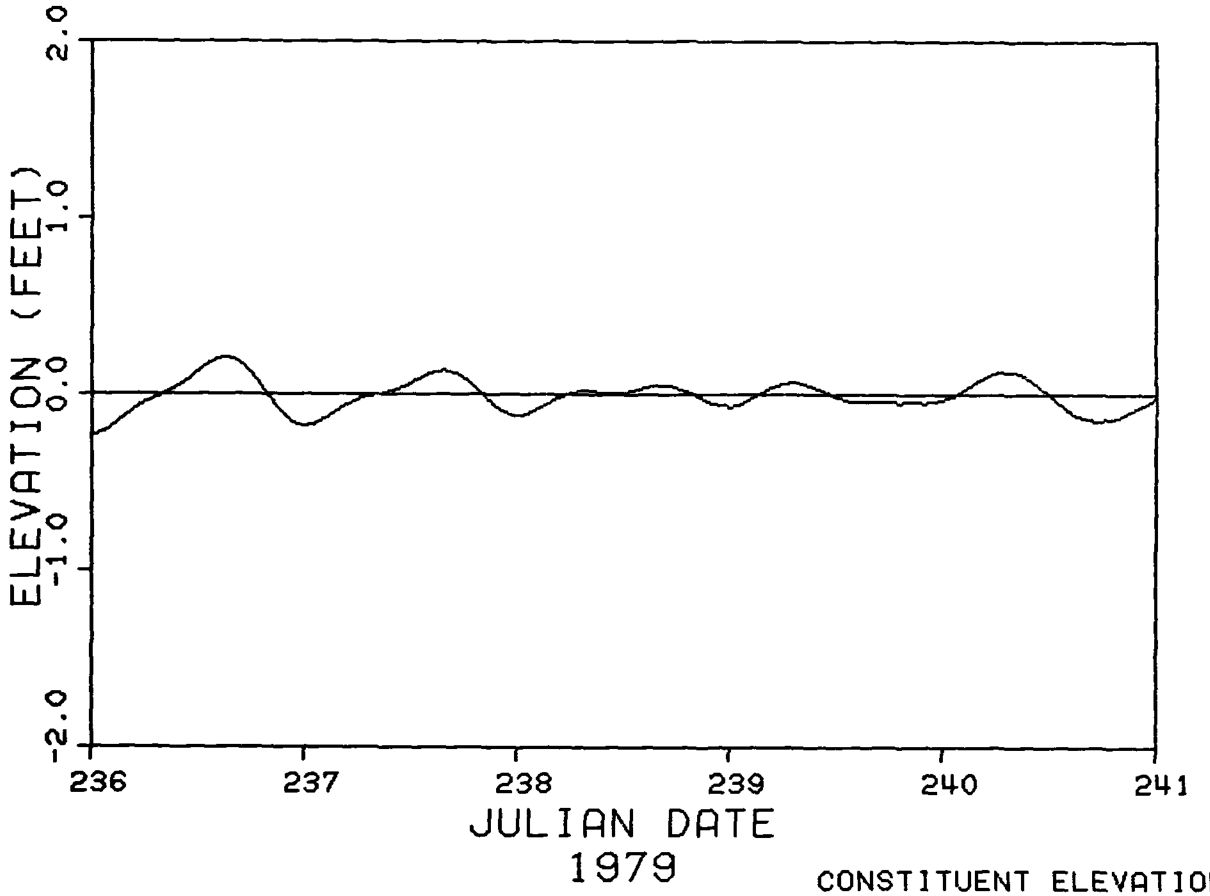
DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



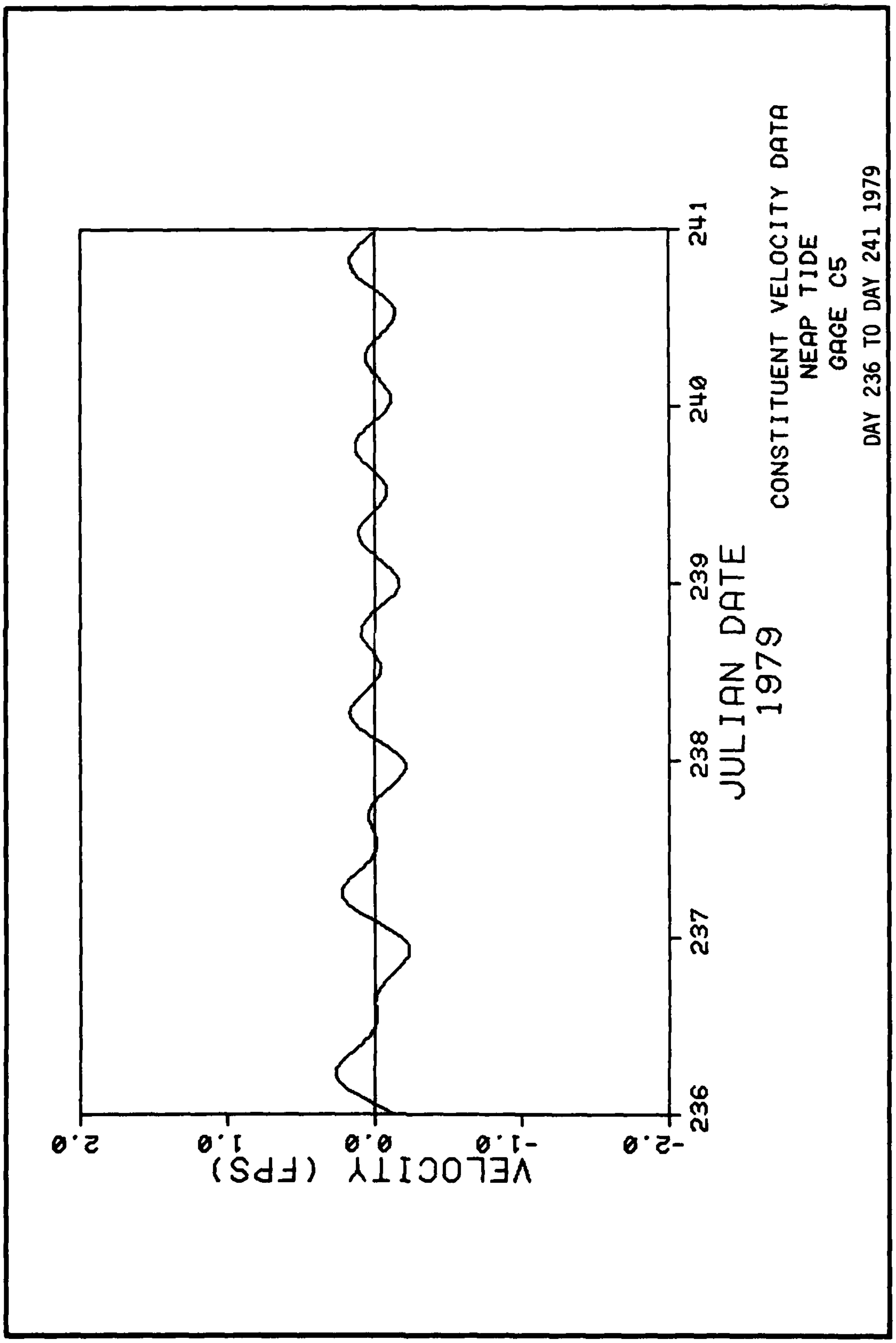
NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.

CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE P-9
DAY 236 TO DAY 241 1979



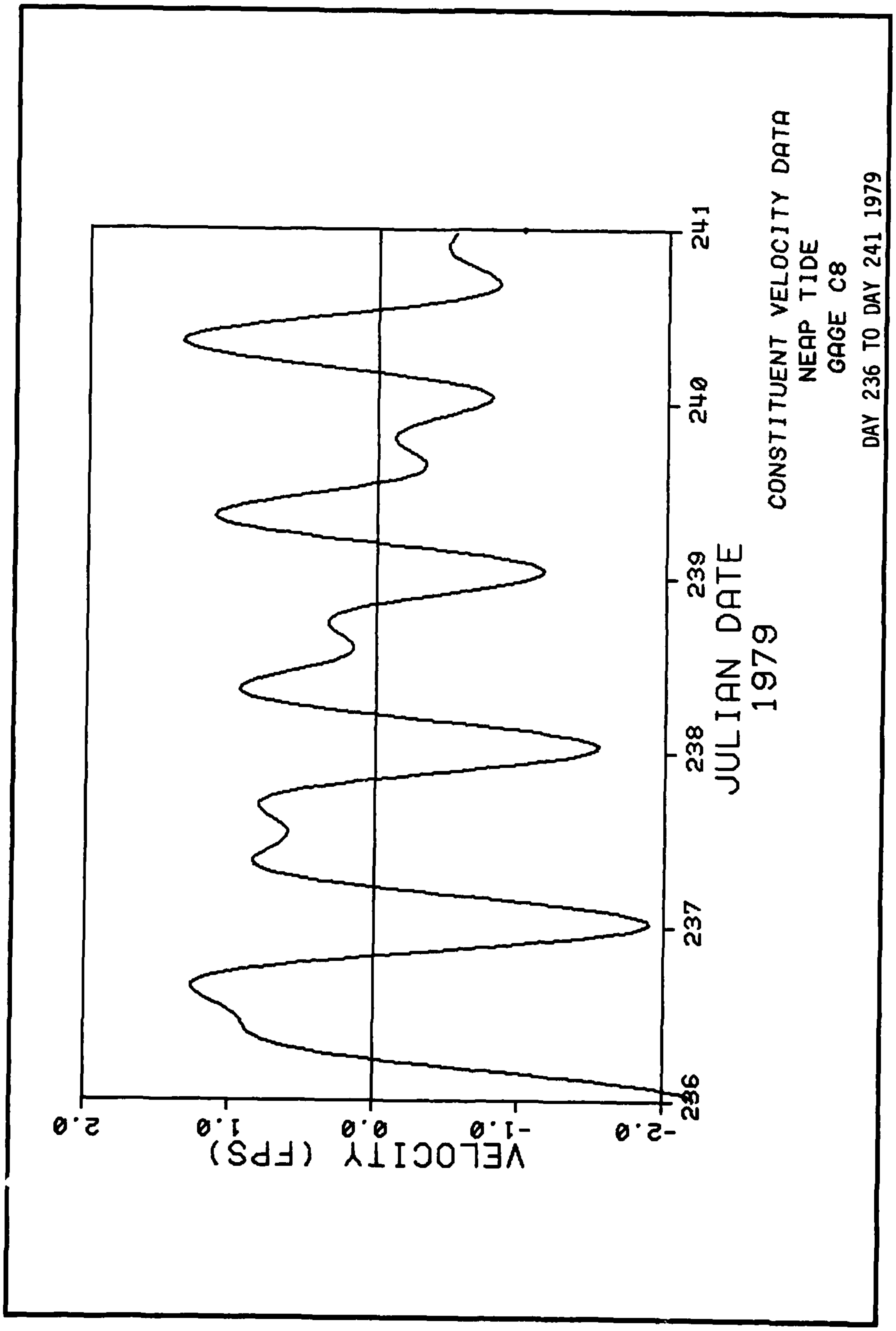
CONSTITUENT ELEVATION DATA
NEAP TIDE
GAGE R-1
DAY 236 TO DAY 241 1979

NOTE: ZERO ELEVATION REFERENCE OF THE PROTOTYPE DATA IS THE MEAN OF THE RECORD.



CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C5
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
236
237
238
239
240
241
VELOCITY (FPS)
-2.0
-1.0
0.0
1.0
2.0

PLATE E170



CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C8
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
VELOCITY (FPS)
-2.0
-1.0
0.0
1.0
2.0
236
237
238
239
240
241

PLATE E171

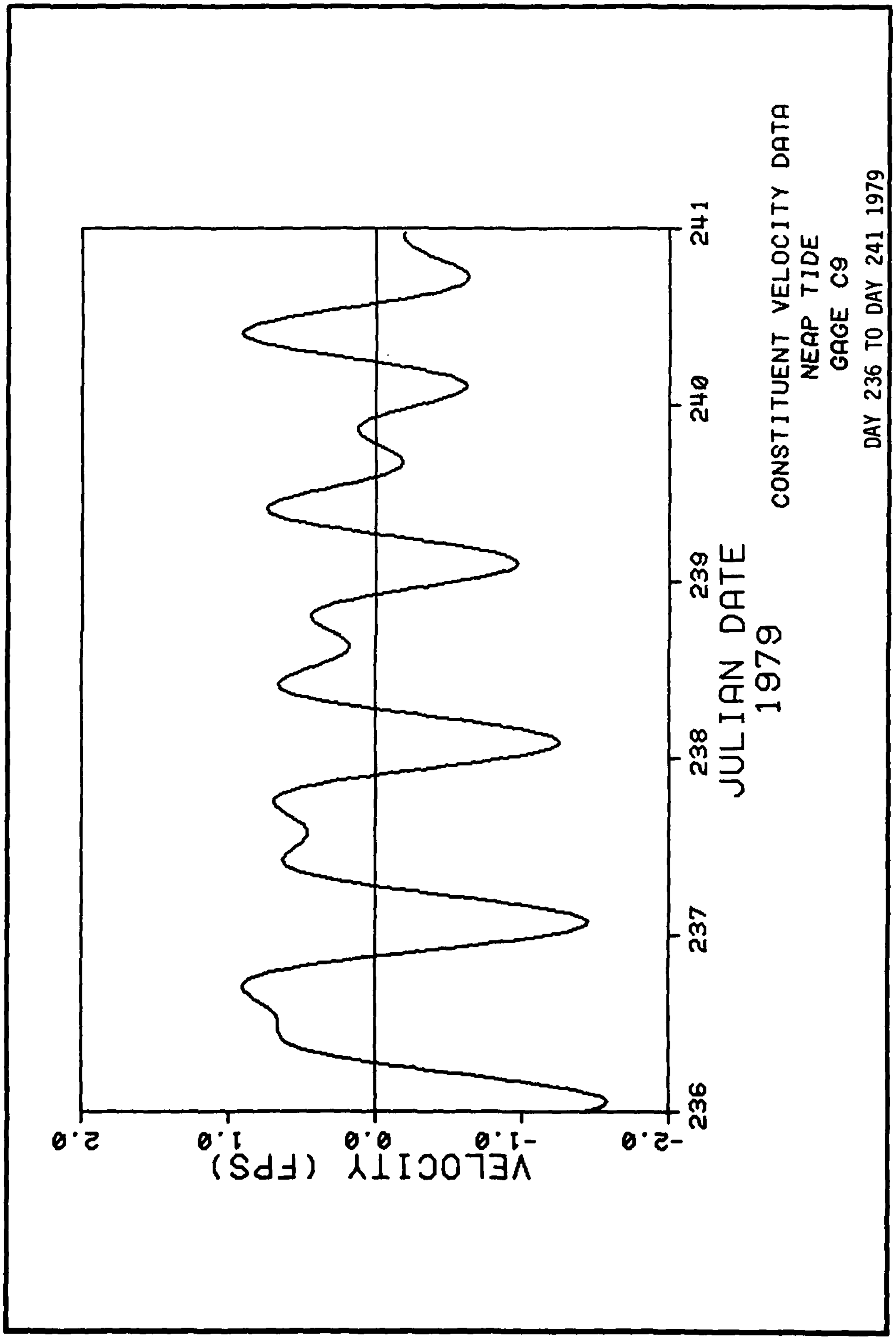
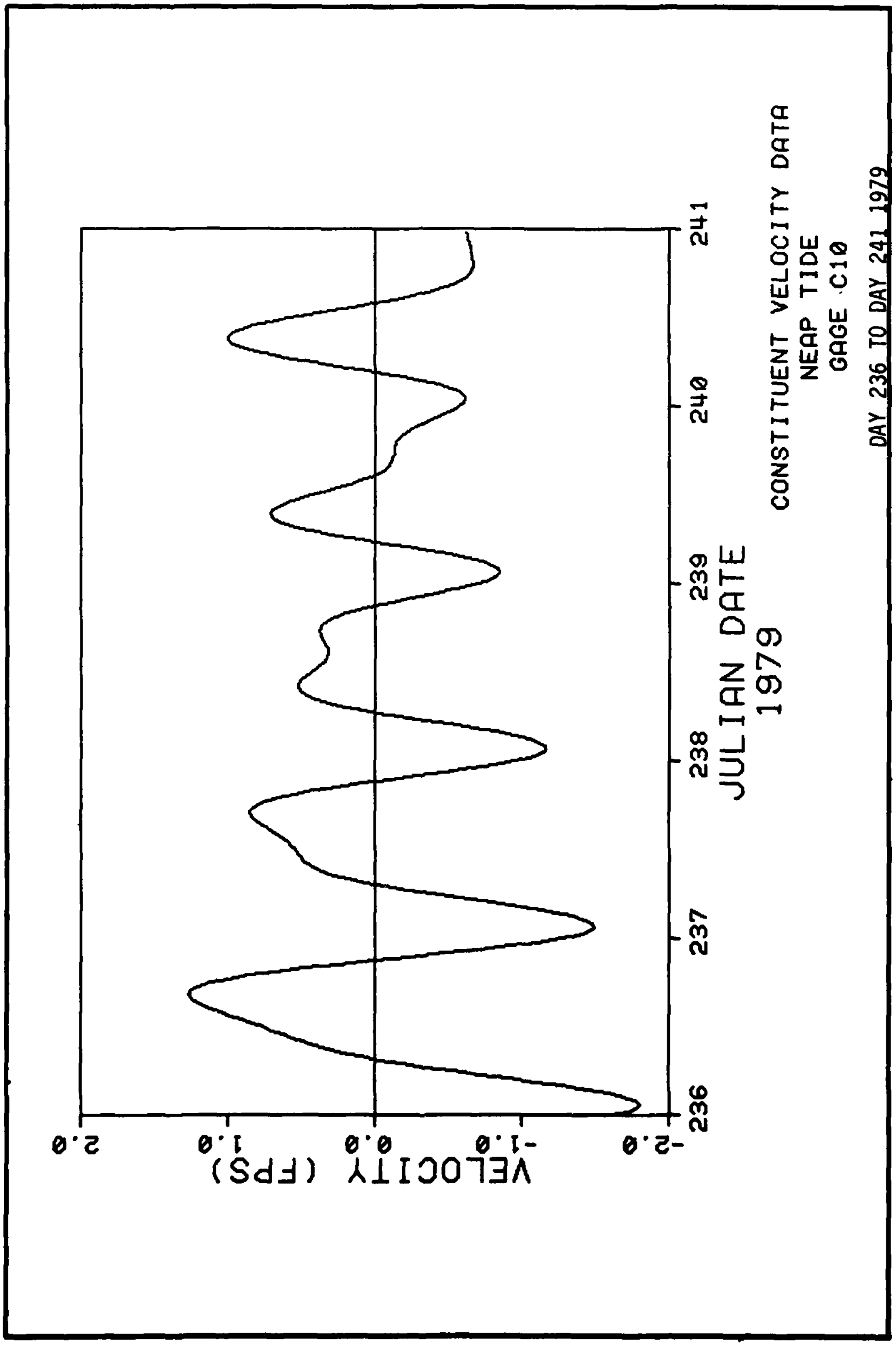

CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C9
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
236
237
238
239
240
241
VELOCITY (FPS)
-2.0
-1.0
0.0
1.0
2.0

PLATE E172


CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C10
DAY 236 TO DAY 241 1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241
JULIAN DATE
1979

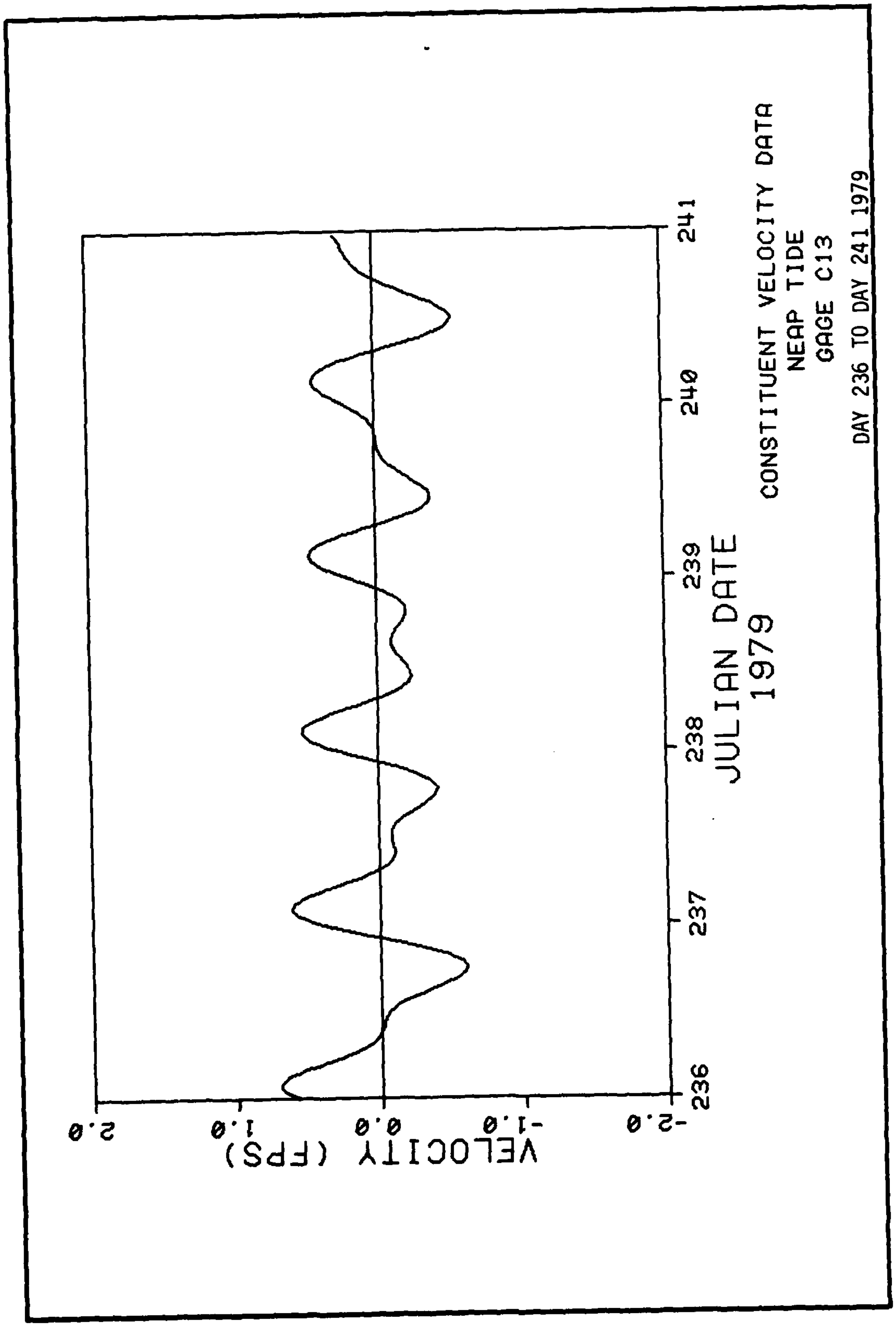
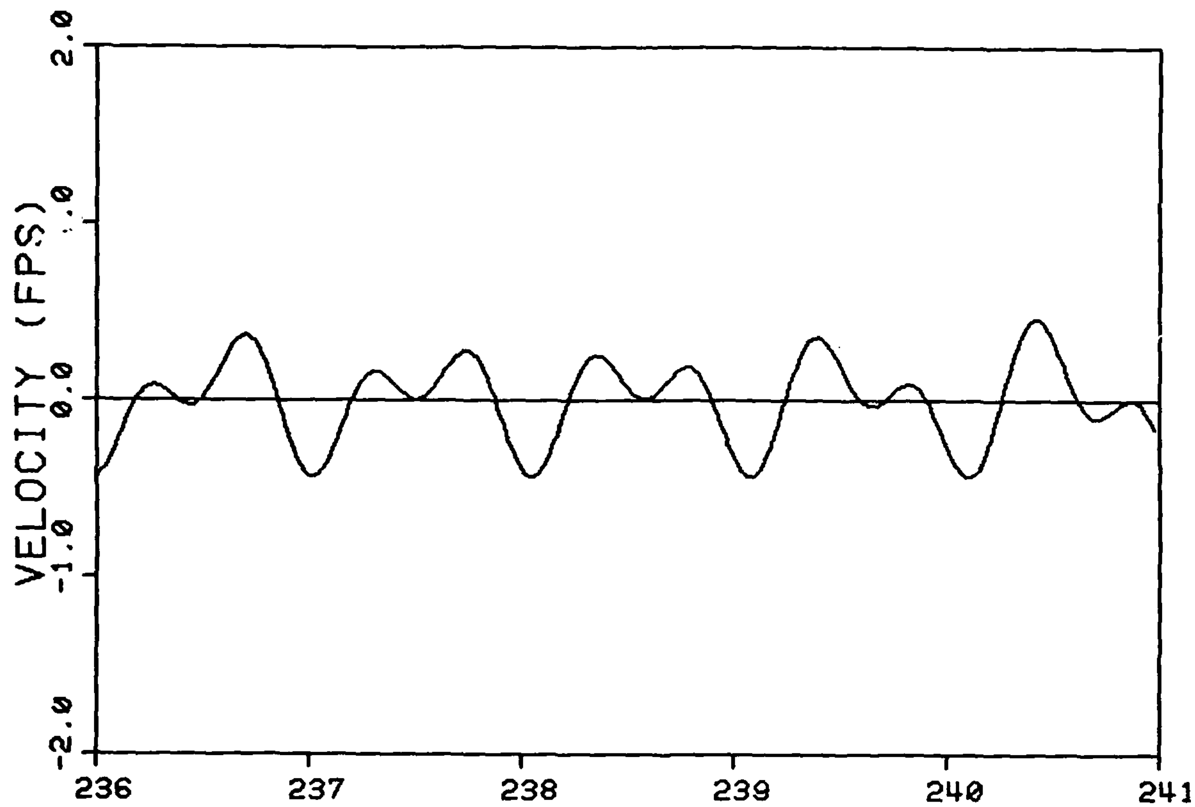

CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C13
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241

PLATE E174



JULIAN DATE
1979

CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C14
DAY 236 TO DAY 241 1979

PLATE E175

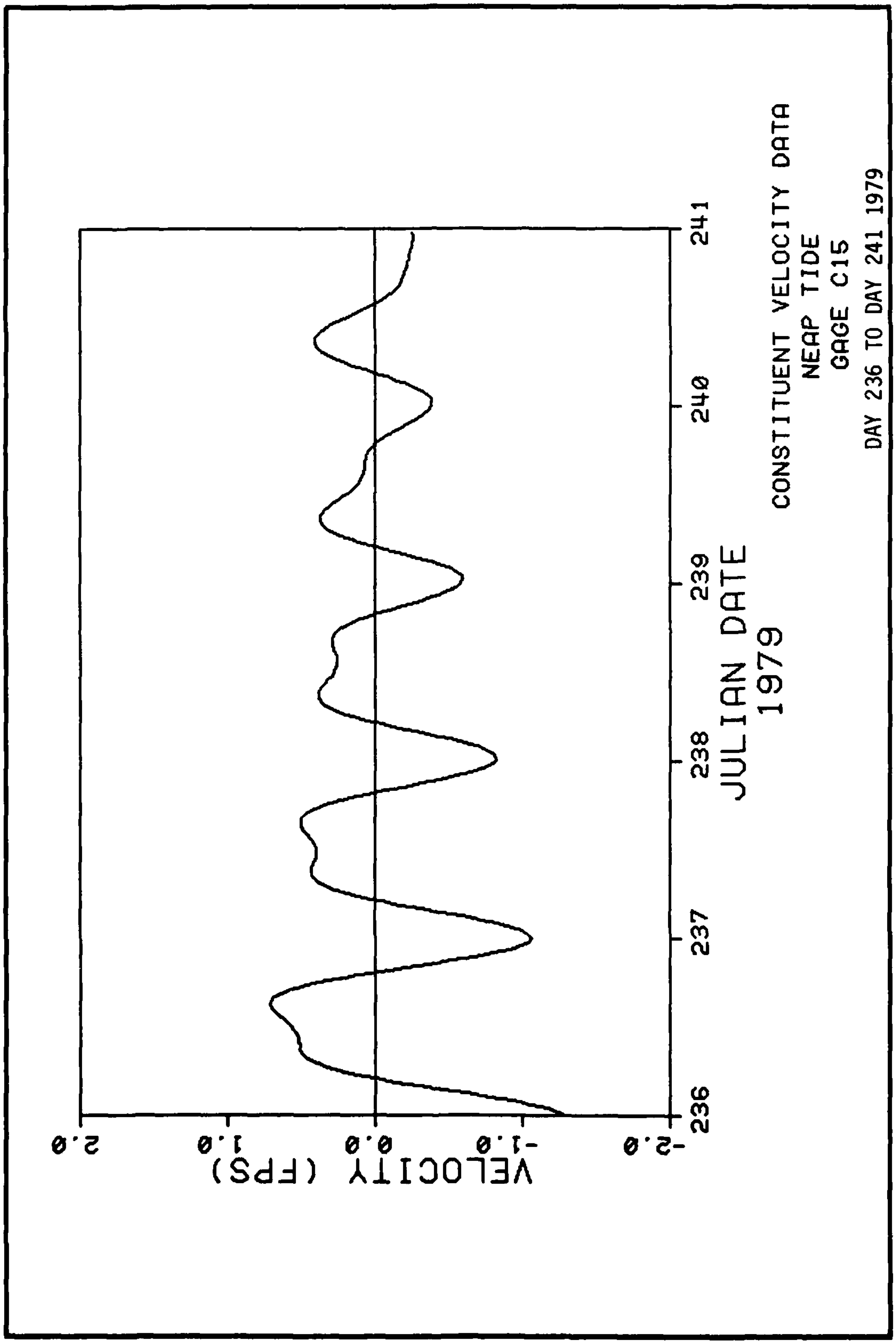

CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C15
DAY 236 TO DAY 241 1979
JULIAN DATE
1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241

PLATE E176

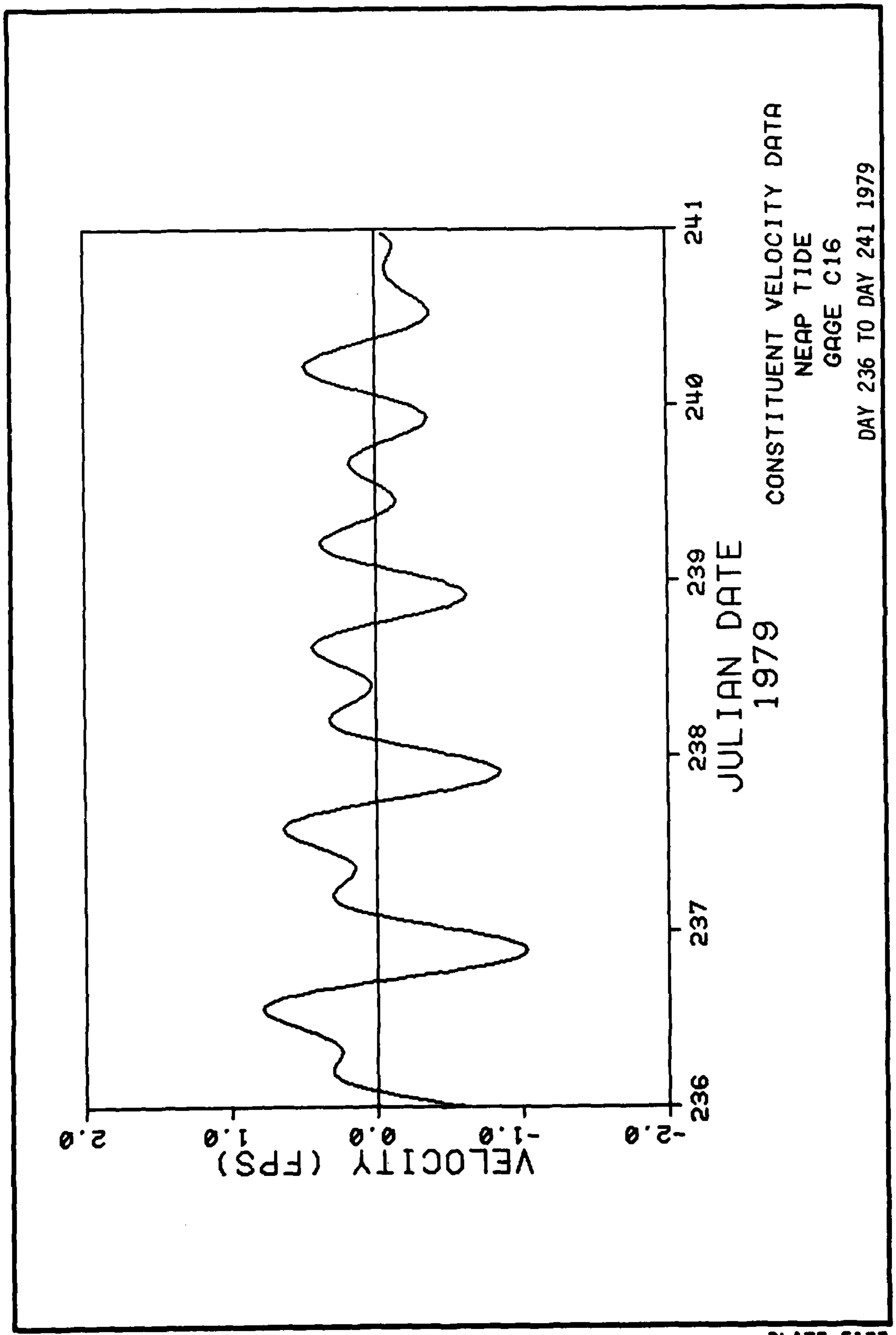
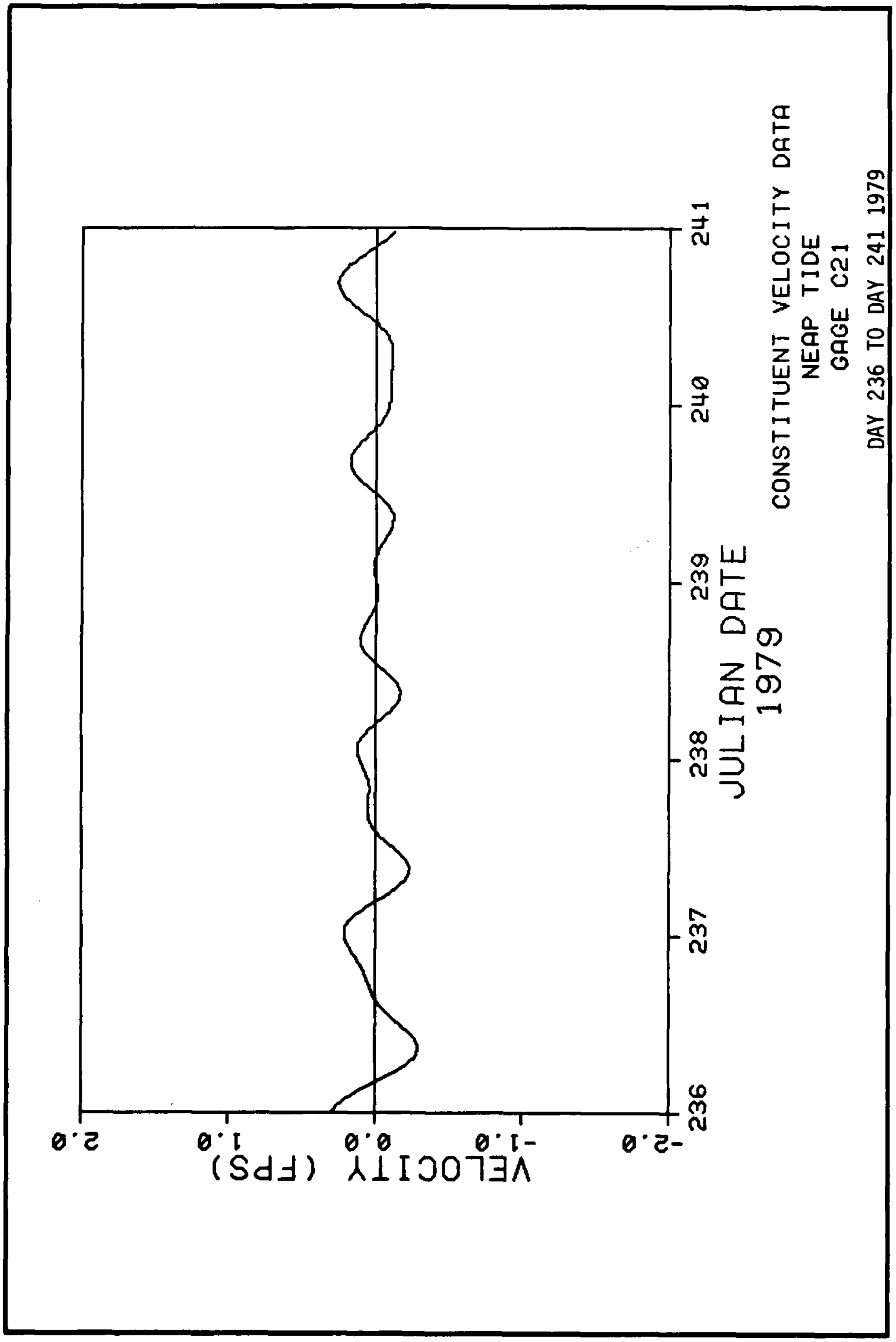

CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C16
DAY 236 TO DAY 241 1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241
JULIAN DATE
1979

PLATE E177



CONSTITUENT VELOCITY DATA
NEAP TIDE
GAGE C21
DAY 236 TO DAY 241 1979
VELOCITY (FPS)
2.0
1.0
0.0
-1.0
-2.0
236
237
238
239
240
241
JULIAN DATE
1979

PLATE E178

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Outlaw, Douglas G.
  Lake Pontchartrain and vicinity hurricane protection plan : Report 1 : Prototype data acquisition and analysis / by Douglas G. Outlaw (Hydraulics Laboratory, U.S. Army Engineer Waterways Experiment Station). -- Vicksburg, Miss. : The Station ; Springfield, Va. : available from NTIS, 1982.
  124 p. in various pagings, 500 p. of plates : ill. ; 27 cm. -- (Technical report ; HL-82-2, Report 1)
  Cover title.
  "January 1982."
  "Prepared for U.S. Army Engineer District, New Orleans."
  Bibliography: p. 51.

  1. Electronic data processing. 2. Hurricane protection. 3. Lake Pontchartrain (La.) I. United States. Army. Corps of Engineers. New Orleans District. II. U.S. Army Engineer Waterways Experiment Station. Hydraulics

Outlaw, Douglas G.
  Lake Pontchartrain and vicinity hurricane : ... 1982.
(Card 2)

Laboratory. III. Title IV. Series: Technical report (U.S. Army Engineer Waterways Experiment Station) ; HL-82-2, Report 1.
TA7.W34 no.HL-82-2 Report 1